Test Bank for Trigonometry 11th Sullivan

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MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Name the quadrant in which the point is located.

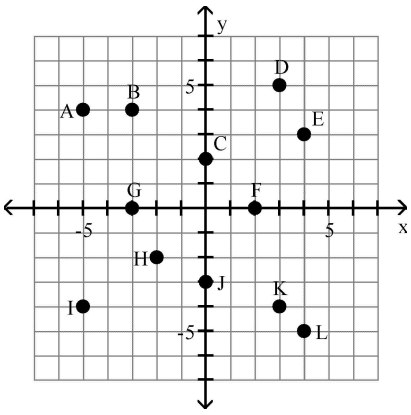
1) (16, 14)
A) I B) II C) III D) IV
Answer: A

2) (–18, 8)
A) I B) II C) III D) IV
Answer: B

3) (–12, –19)
A) I B) II C) III D) IV
Answer: C

4) (13, –11)
A) I B) II C) III D) IV
Answer: D

Identify the points in the graph for the ordered pairs.



5) (0, 2), (4, 3)
A) F and E B) C and E C) B and C D) C and K
Answer: B

6) (–5, –4), (0, –3)
A) A and G B) I and J C) A and J D) G and I
Answer: B

7) (–3, 4), (2, 0), (4, –5)
A) F, K, and L B) A, B, and F C) B, C, and L D) B, F, and L
Answer: D

8) (3, 5), (–3, 0)
A) D and J B) I and G C) L and J D) D and G
Answer: D

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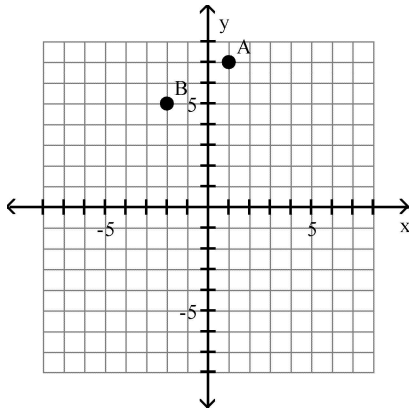
Give the coordinates of the points shown on the graph.

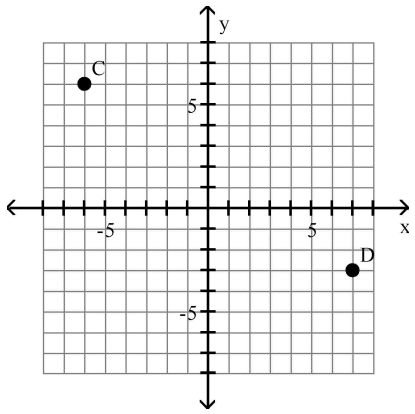
9)



A) A = (1, 5), B = (7, 5)
B) A = (1, 7), B = (–2, 5)
C) A = (1, 7), B = (5, –2)
D) A = (7, 18), B = (5, –2)

Answer: B

10)



A) C = (6, –6), D = (–3, 7)
B) C = (–6, 6), D = (–3, 7)
C) C = (–6, –3), D = (6, –3)
D) C = (–6, 6), D = (7, –3)

Answer: D

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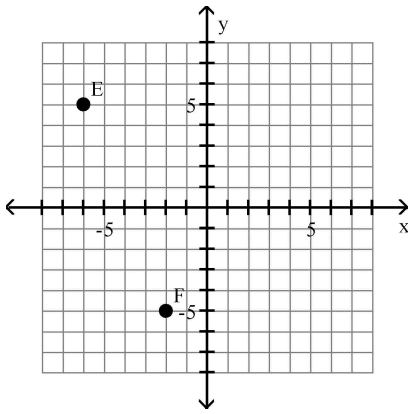
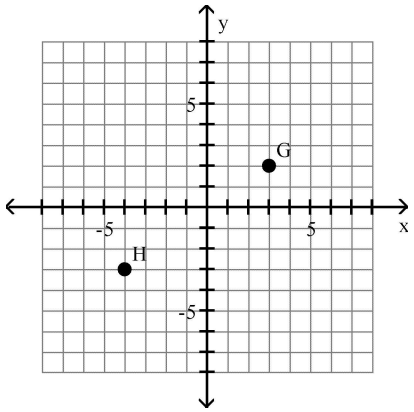
11)



A) E = (5, –6), F = (–5, –2)
B) E = (–2, –5) , F = (–6, 5)
C) E = (–6, 5), F = (–2, –5)
D) E = (–6, –5), F = (5, –5)

Answer: C

12)

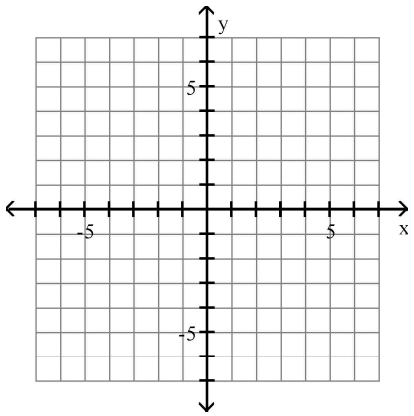


A) G = (3, 2), H = (–3, –4)
B) G = (3, –3), H = (2, –3)
C) G = (2, 3), H = (–3, –4)
D) G = (3, 2), H = (–4, –3)

Answer: D

Plot the point in the xy–plane. Tell in which quadrant or on what axis the point lies.

13) (4, 6)



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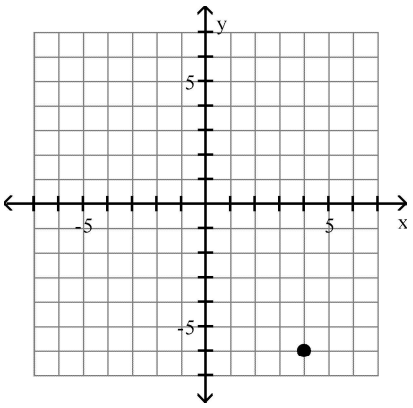
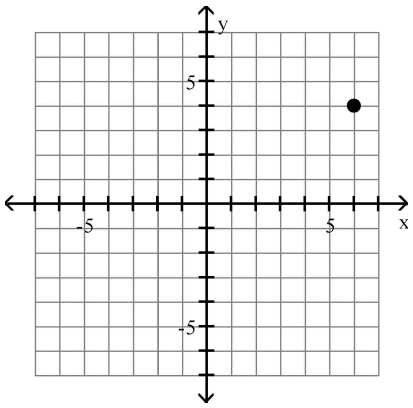
A)



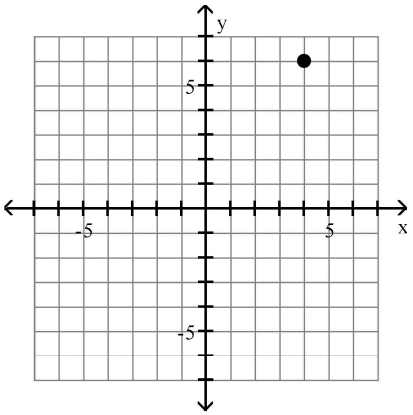
Quadrant IV

B)



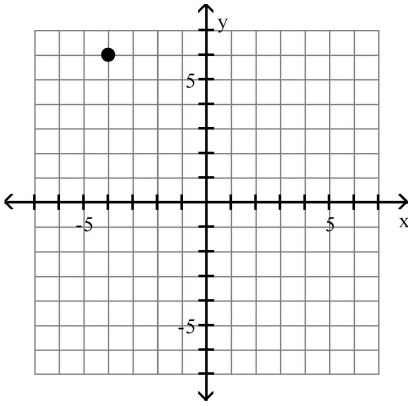
Quadrant I

C)



Quadrant I

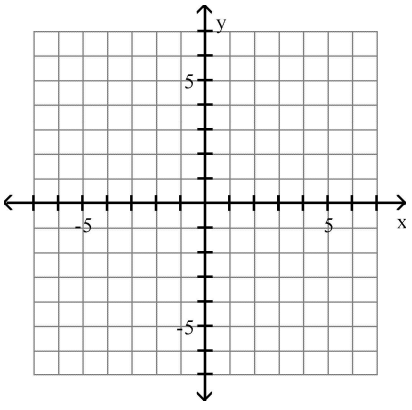
D)



Quadrant II

Answer: C

14) (–4, 5)



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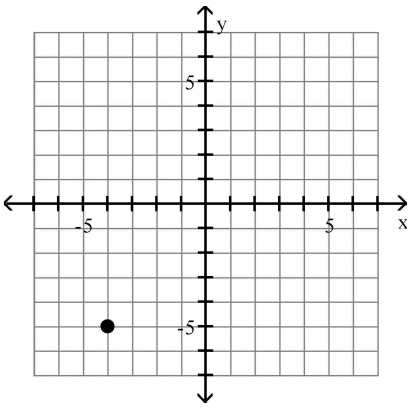
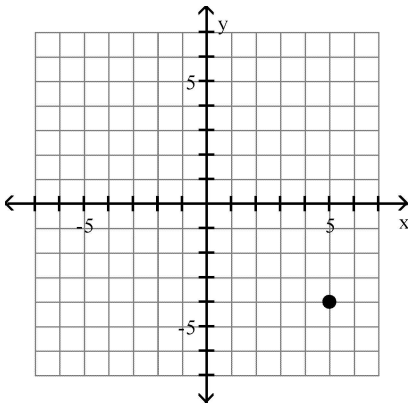
A)



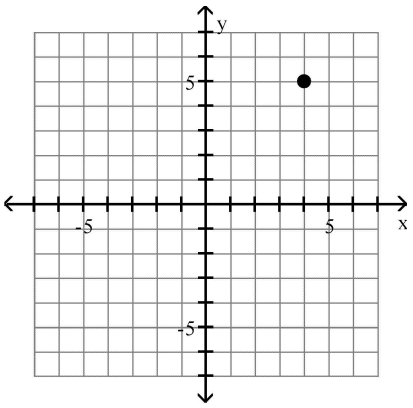
Quadrant III

B)



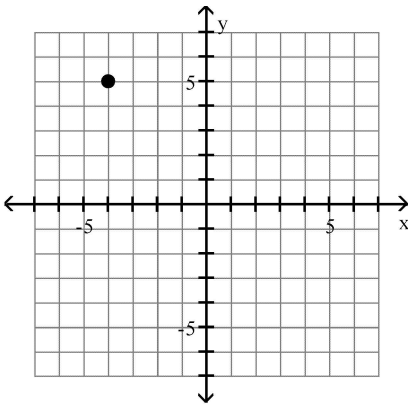
Quadrant IV

C)



Quadrant I

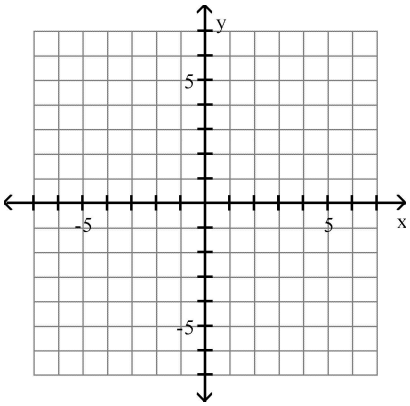
D)



Quadrant II

Answer: D

15) (4, –6)



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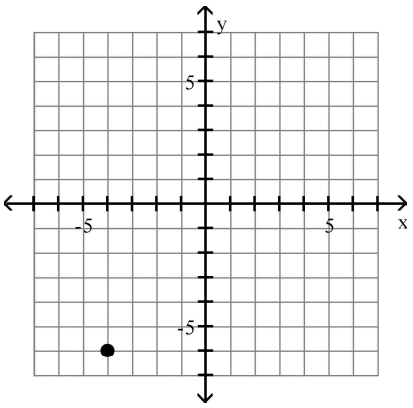
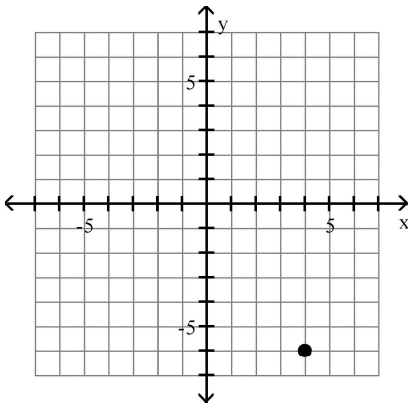
A)



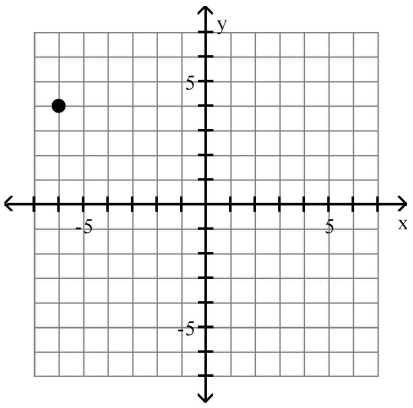
Quadrant III

B)



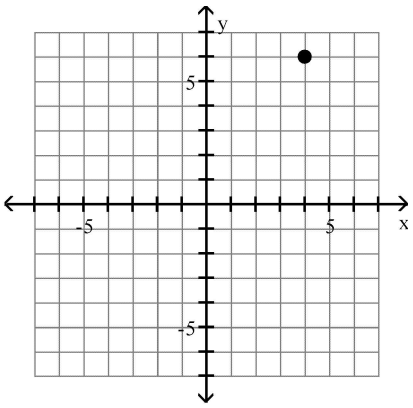
Quadrant IV

C)



Quadrant II

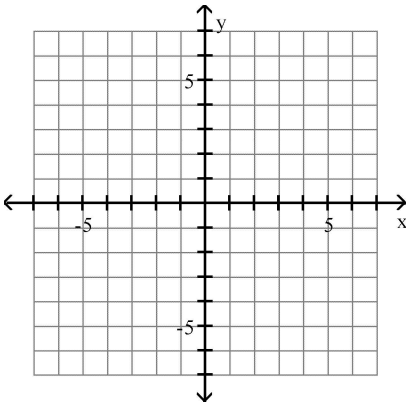
D)



Quadrant I

Answer: B

16) (–1, –2)



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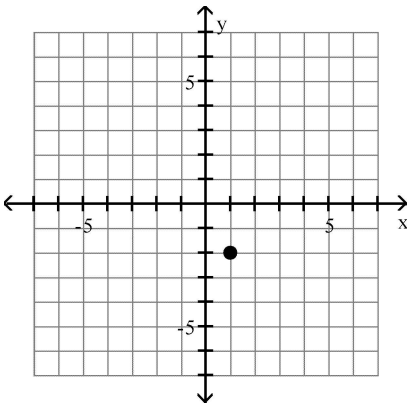
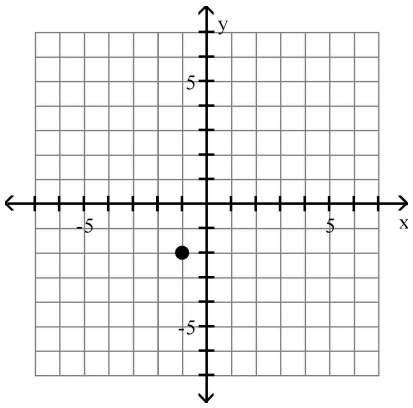
A)



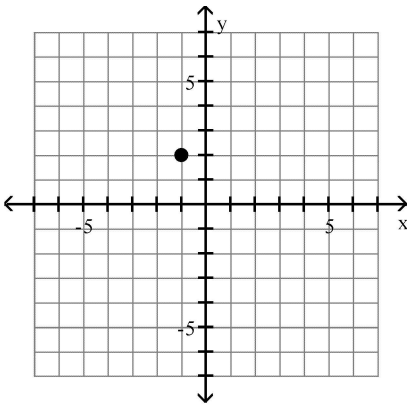
Quadrant IV

B)



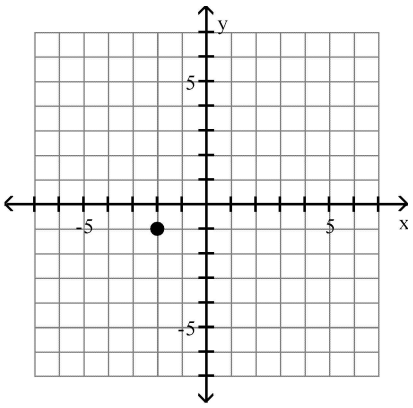
Quadrant III

C)



Quadrant II

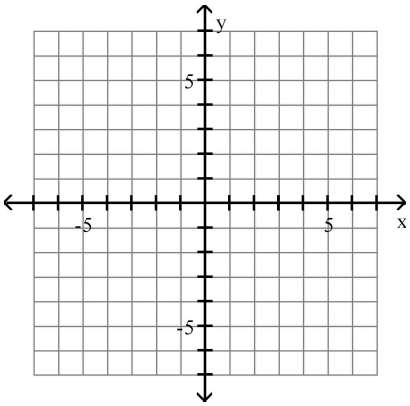
D)



Quadrant III

Answer: B

17) (0, 2)



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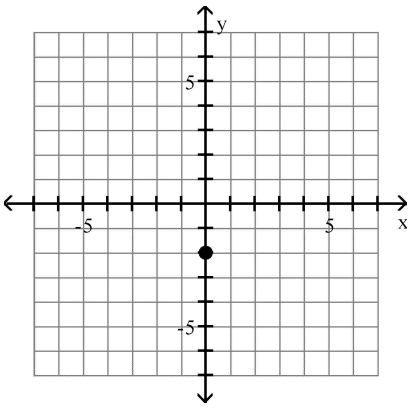
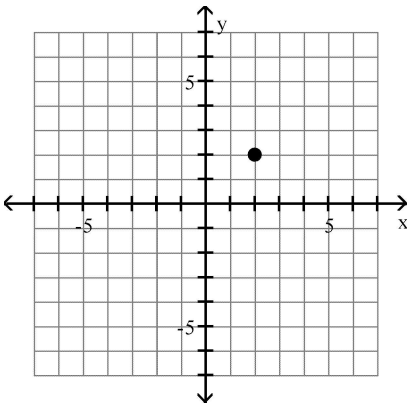
A)



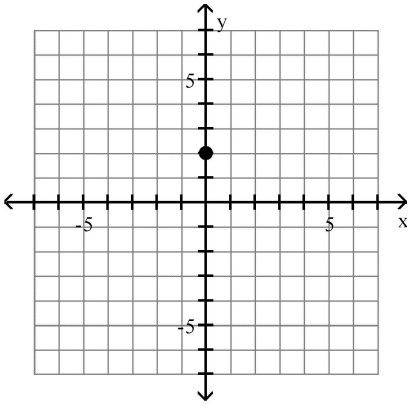
y-axis

B)



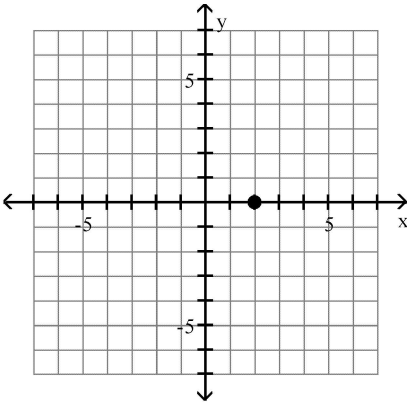
Quadrant II

C)



y-axis

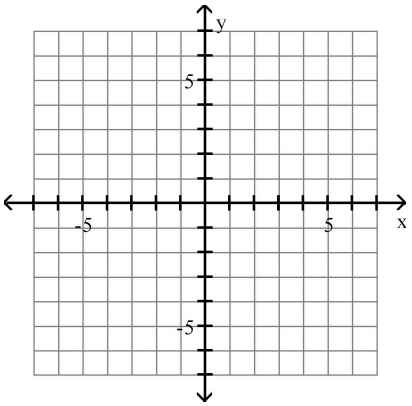
D)



x-axis

Answer: C

18) (3, 0)



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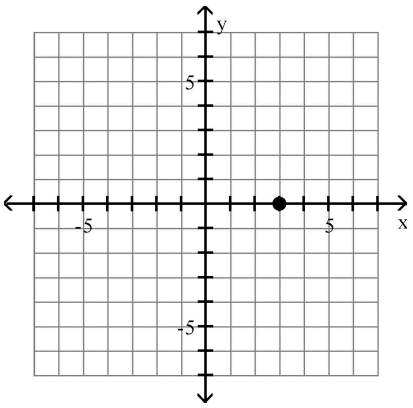
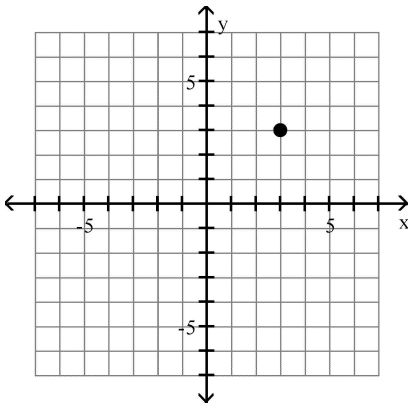
A)



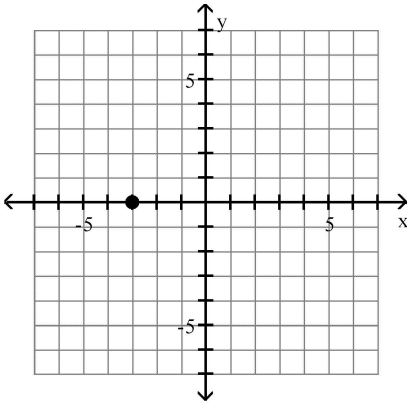
x–axis

B)



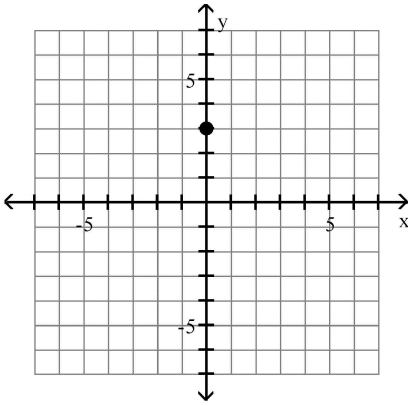
Quadrant II

C)



x–axis

D)

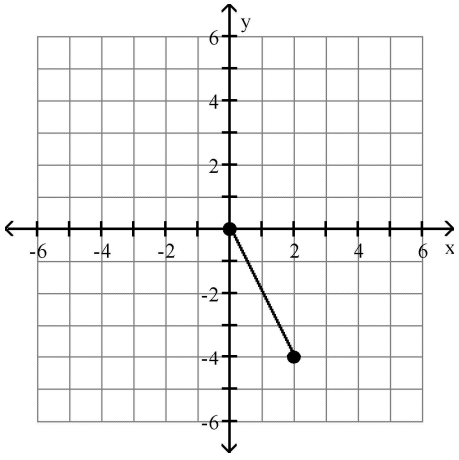


y–axis

Answer: A

Find the distance d(P_1, P_2) between the points P_1 and P_2.

19)



A) $2\sqrt{5}$ B) 7 C) 5 D) $\sqrt{6}$

Answer: A

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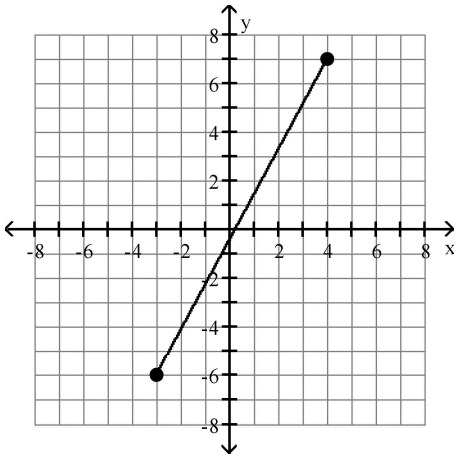
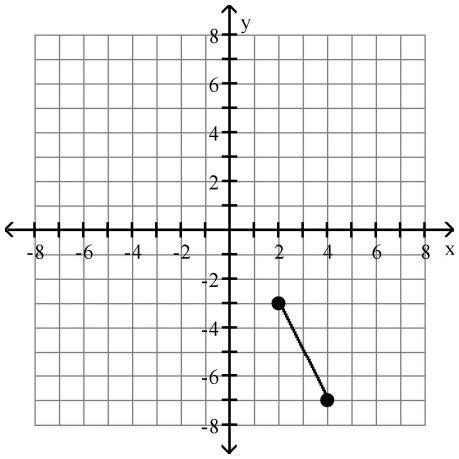
20)



A) $\sqrt{218}$ B) 91 C) $2\sqrt{30}$ D) 6

Answer: A

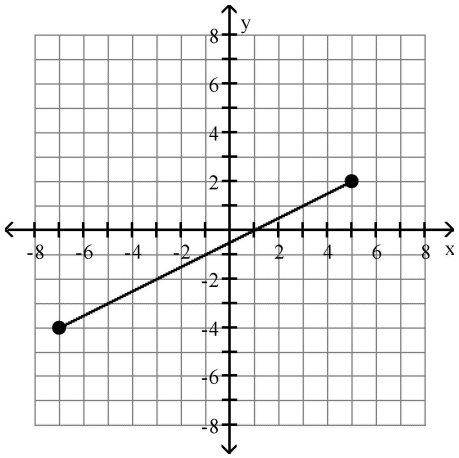
21)



A) 12 B) $2\sqrt{5}$ C) 6 D) $12\sqrt{3}$

Answer: B

22)



A) 6 B) $108\sqrt{3}$ C) $6\sqrt{5}$ D) 108

Answer: C

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23) $P_1 = (-3, -3)$; $P_2 = (-3, 4)$

A) $\sqrt{7}$ B) 6 C) 8 D) 7

Answer: D

24) $P_1 = (-2, 2)$; $P_2 = (-8, -6)$

A) 11 B) 10 C) 100 D) 20

Answer: B

25) $P_1 = (0, -3)$; $P_2 = (8, -3)$

A) 8 B) 3 C) 64 D) $\sqrt{73}$

Answer: A

26) $P_1 = (0, 0)$; $P_2 = (-3, -4)$

A) $2i\sqrt{3}$ B) 5 C) 7 D) 25

Answer: B

27) $P_1 = (4, 3)$; $P_2 = (-1, -5)$

A) 40 B) 3 C) $\sqrt{89}$ D) $\sqrt{39}$

Answer: C

28) $P_1 = (7, -5)$; $P_2 = (3, -7)$

A) 2 B) $2\sqrt{5}$ C) 12 D) $12\sqrt{3}$

Answer: B

29) $P_1 = (-5, -3)$; $P_2 = (7, -7)$

A) $4\sqrt{10}$ B) 128 C) $128\sqrt{2}$ D) 16

Answer: A

30) $P_1 = (-0.4, -0.8)$; $P_2 = (1.6, -2.4)$ Round to three decimal places, if necessary.

A) 2.661 B) 2.561 C) 8.099 D) 18

Answer: B

Decide whether or not the points are the vertices of a right triangle.

31) (–7, 1), (–5, 1), (–5, 5)

A) Yes B) No

Answer: A

32) (7, 7), (9, 11), (11, 10)

A) Yes B) No

Answer: A

33) (2, 7), (8, 9), (7, 4)

A) Yes B) No

Answer: B

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34) (6, –4), (12, –2), (18, –9)

A) Yes B) No

Answer: B

Solve the problem.

35) Find all values of k so that the given points are $\sqrt{29}$ units apart.
(–5, 5), (k, 0)

A) 7 B) 3, 7 C) –3, –7 D) –7

Answer: C

36) Find the area of the right triangle ABC with A = (–2, 7), B = (7, –1), C = (3, 9).

A) 29 square units B) $\frac{\sqrt{29}}{2}$ square units C) 58 square units D) $\frac{\sqrt{58}}{2}$ square units

Answer: A

37) Find all the points having an x–coordinate of 9 whose distance from the point (3, –2) is 10.

A) (9, –12), (9, 8) B) (9, 2), (9, –4) C) (9, 6), (9, –10) D) (9, 13), (9, –7)

Answer: C

38) A middle school's baseball playing field is a square, 60 feet on a side. How far is it directly from home plate to second base (the diagonal of the square)? If necessary, round to the nearest foot.

A) 86 feet B) 92 feet C) 84 feet D) 85 feet

Answer: D

39) A motorcycle and a car leave an intersection at the same time. The motorcycle heads north at an average speed of 20 miles per hour, while the car heads east at an average speed of 48 miles per hour. Find an expression for their distance apart in miles at the end of t hours.

A) $t\sqrt{68}$ miles B) $2t\sqrt{13}$ miles C) 52t miles D) $52\sqrt{t}$ miles

Answer: C

40) A rectangular city park has a jogging loop that goes along a length, width, and diagonal of the park. To the nearest yard, find the length of the jogging loop, if the length of the park is 125 yards and its width is 75 yards.

A) 346 yards B) 145 yards C) 146 yards D) 345 yards

Answer: A

41) Find the length of each side of the triangle determined by the three points P_1, P_2, and P_3. State whether the triangle is an isosceles triangle, a right triangle, neither of these, or both.
$P_1 = (-5, -4)$, $P_2 = (-3, 4)$, $P_3 = (0, -1)$

A) $d(P_1, P_2) = 2\sqrt{17}$; $d(P_2, P_3) = \sqrt{34}$; $d(P_1, P_3) = 5\sqrt{2}$
neither

B) $d(P_1, P_2) = 2\sqrt{17}$; $d(P_2, P_3) = \sqrt{34}$; $d(P_1, P_3) = 5\sqrt{2}$
right triangle

C) $d(P_1, P_2) = 2\sqrt{17}$; $d(P_2, P_3) = \sqrt{34}$; $d(P_1, P_3) = \sqrt{34}$
both

D) $d(P_1, P_2) = 2\sqrt{17}$; $d(P_2, P_3) = \sqrt{34}$; $d(P_1, P_3) = \sqrt{34}$
isosceles triangle

Answer: C

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Find the midpoint of the line segment joining the points P_1 and P_2.

42) $P_1 = (6, 5)$; $P_2 = (8, 7)$

A) $(-2, -2)$ B) $(6, 7)$ C) $(14, 12)$ D) $(7, 6)$

Answer: D

43) $P_1 = (4, 9)$; $P_2 = (2, -2)$

A) $\left(1, \frac{11}{2}\right)$ B) $(6, 7)$ C) $(2, 11)$ D) $\left(3, \frac{7}{2}\right)$

Answer: D

44) $P_1 = (7, 1)$; $P_2 = (-16, -16)$

A) $(-9, -15)$ B) $(9, 15)$ C) $\left(\frac{23}{2}, \frac{17}{2}\right)$ D) $\left(-\frac{9}{2}, -\frac{15}{2}\right)$

Answer: D

45) $P_1 = (0.7, -0.6)$; $P_2 = (-2.5, 2.9)$

A) $(1.15, -0.9)$ B) $(-0.9, 1.15)$ C) $(-1.6, 1.75)$ D) $(1.75, -1.6)$

Answer: B

46) $P_1 = (y, 5)$; $P_2 = (0, 3)$

A) $\left(-\frac{y}{2}, 2\right)$ B) $(y, 4)$ C) $\left(\frac{y}{2}, 4\right)$ D) $(y, 8)$

Answer: C

47) $P_1 = (2b, 9)$; $P_2 = (3b, 8)$

A) $\left(\frac{17b}{2}, \frac{5}{2}\right)$ B) $(b, 1)$ C) $\left(\frac{5b}{2}, \frac{17}{2}\right)$ D) $(5b, 17)$

Answer: C

Solve the problem.

48) If $(-5, -2)$ is the endpoint of a line segment, and $(-2, 0)$ is its midpoint, find the other endpoint.

A) $(1, -4)$ B) $(1, 2)$ C) $(-11, -6)$ D) $(-1, 4)$

Answer: B

49) If $(-2, 3)$ is the endpoint of a line segment, and $(-5, -2)$ is its midpoint, find the other endpoint.

A) $(-8, 8)$ B) $(-8, -7)$ C) $(4, 13)$ D) $(-12, -3)$

Answer: B

50) If $(5, 10)$ is the endpoint of a line segment, and $(10, 8)$ is its midpoint, find the other endpoint.

A) $(15, 12)$ B) $(15, 6)$ C) $(-5, 14)$ D) $(1, 20)$

Answer: B

51) If $(-8, -7)$ is the endpoint of a line segment, and $(-12, -2)$ is its midpoint, find the other endpoint.

A) $(2, -15)$ B) $(-16, 3)$ C) $(-16, -12)$ D) $(0, -17)$

Answer: B

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52) The medians of a triangle intersect at a point. The distance from the vertex to the point is exactly two-thirds of the distance from the vertex to the midpoint of the opposite side. Find the exact distance of that point from the vertex A(3, 4) of a triangle, given that the other two vertices are at (0, 0) and (8, 0).

A) $\frac{\sqrt{17}}{3}$ B) 2 C) $\frac{8}{3}$ D) $\frac{2\sqrt{17}}{3}$

Answer: D

Determine whether the given point is on the graph of the equation.

53) Equation: $y = x^3 - \sqrt{x}$
Point: (1, 0)

A) No B) Yes

Answer: B

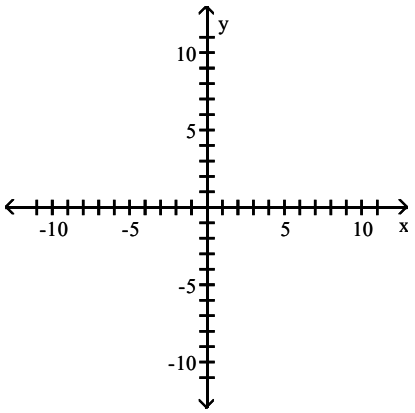
54) Equation: $x^2 - y^2 = 64$
Point: $(4\sqrt{2}, 4\sqrt{2})$

A) Yes B) No

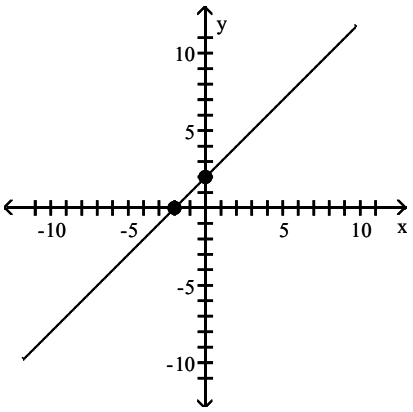
Answer: B

Graph the equation by plotting points.

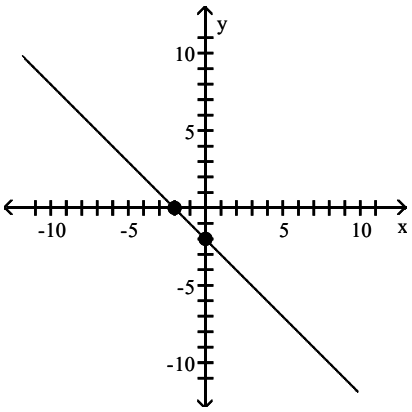
55) $y = x - 2$



A)



B)



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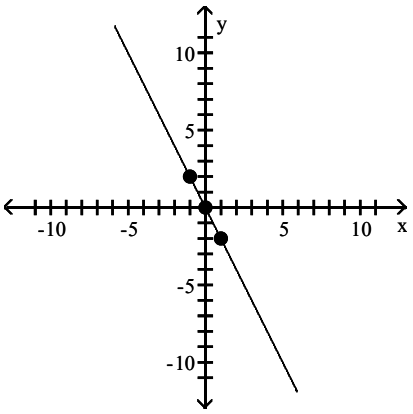
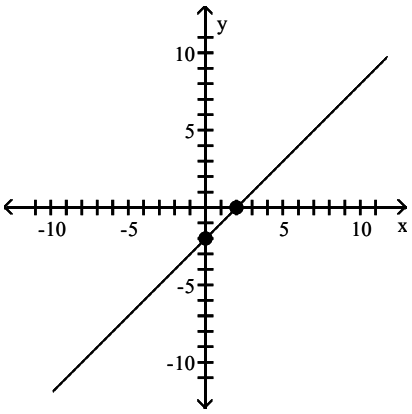
C)

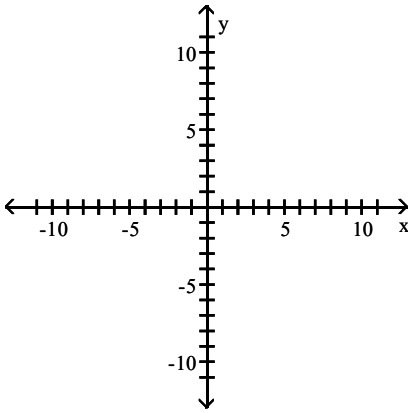


D)

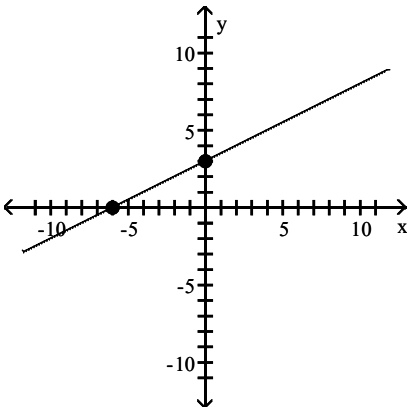


Answer: D

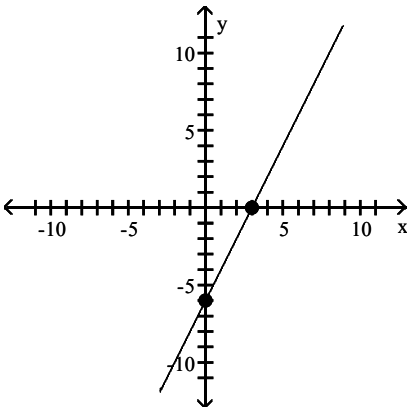
56) $y = 2x - 6$



A)



B)



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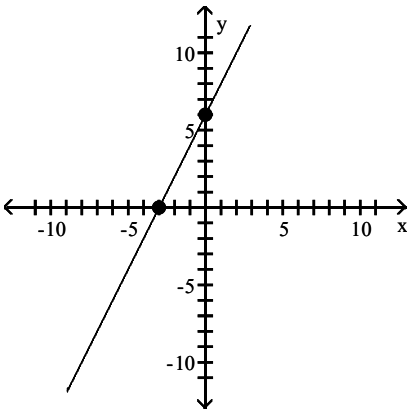
C)



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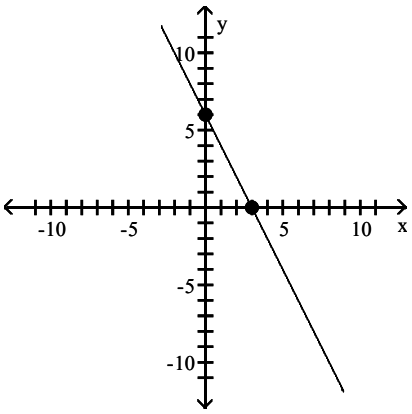
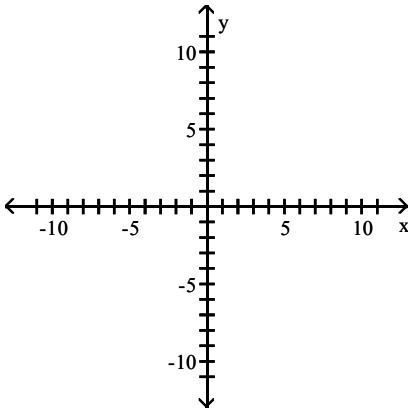
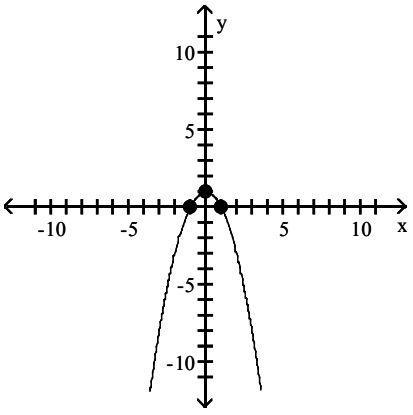


Answer: B

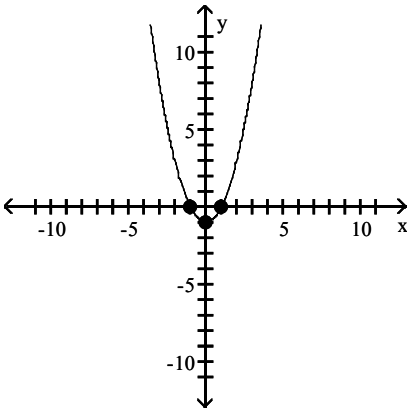
57) $y = -x^2 + 1$



A)



B)



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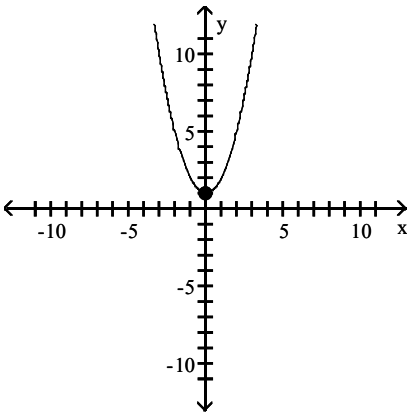
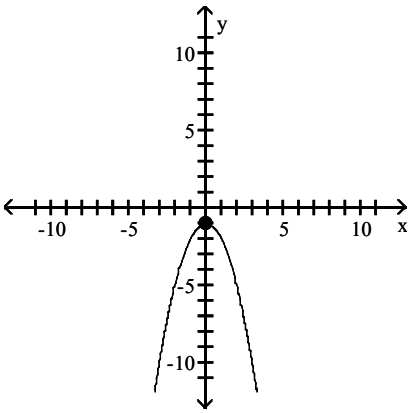
C)

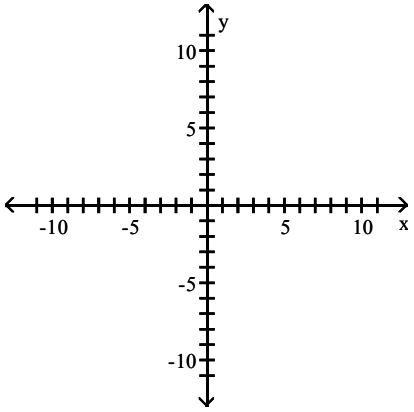


D)

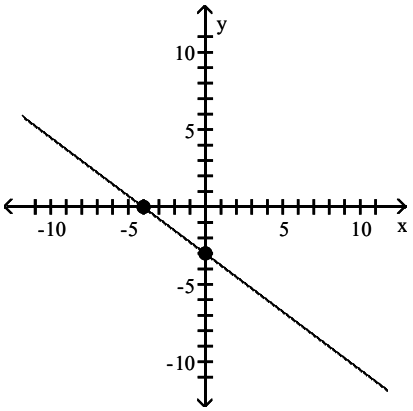


Answer: A

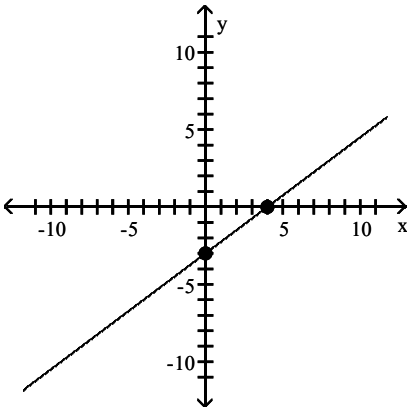
58) $3x + 4y = 12$



A)



B)



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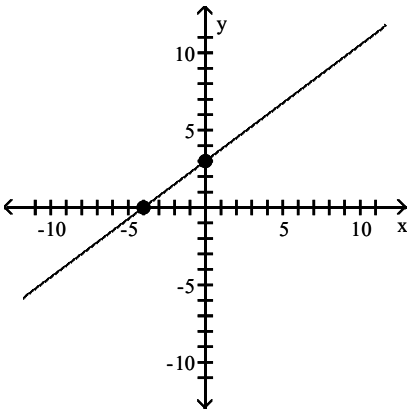
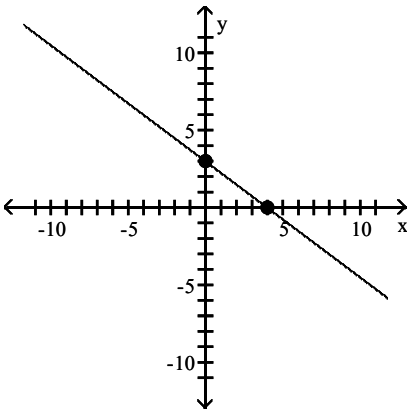
C)

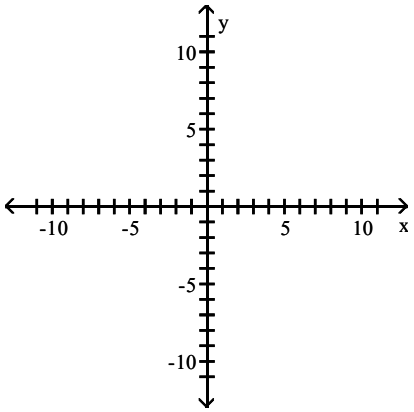


D)

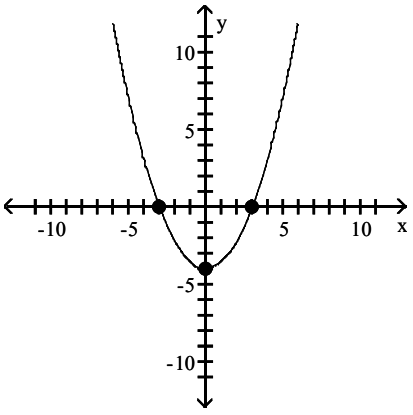


Answer: D

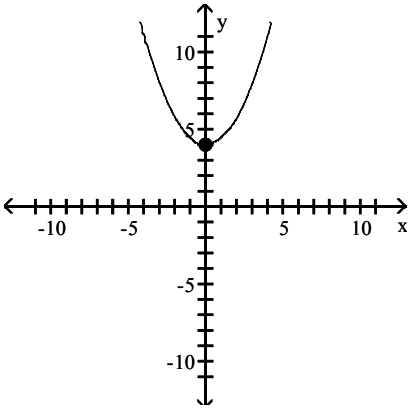
59) $4x^2 + 9y = 36$



A)



B)



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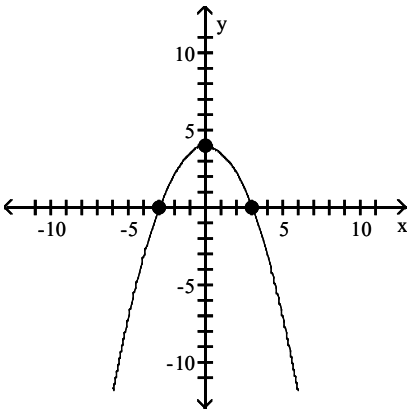
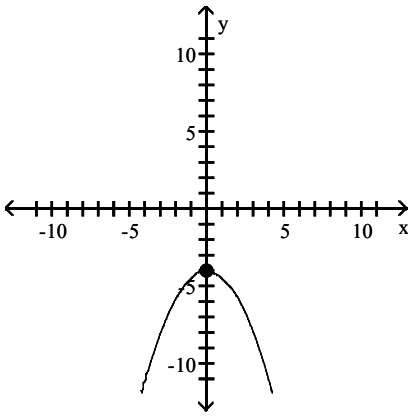
C)



D)



Answer: C

Solve the problem.

60) If (a, 3) is a point on the graph of $y = 2x - 5$, what is a?

A) 1 B) 4 C) −4 D) −1

Answer: B

61) If (3, b) is a point on the graph of $3x - 2y = 17$, what is b?

A) −4 B) $\frac{11}{3}$ C) $\frac{23}{3}$ D) 4

Answer: A

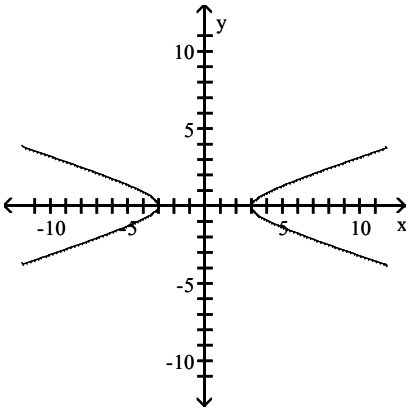
62) The height of a baseball (in feet) at time t (in seconds) is given by $y = -16x^2 + 80x + 5$. Which one of the following points is not on the graph of the equation?

A) (2, 117) B) (3, 101) C) (4, 69) D) (1, 69)

Answer: A

List the intercepts of the graph.

63)



A) (0, −3), (0, 3) B) (−3, 0), (3, 0) C) (−3, 0), (0, 3) D) (0, −3), (3, 0)

Answer: B

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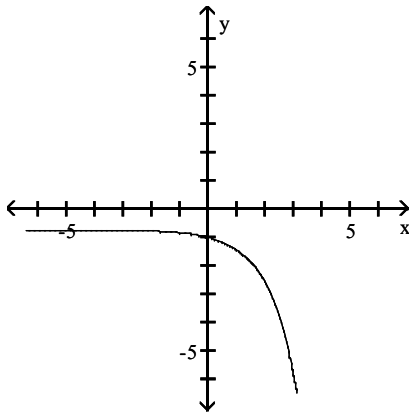
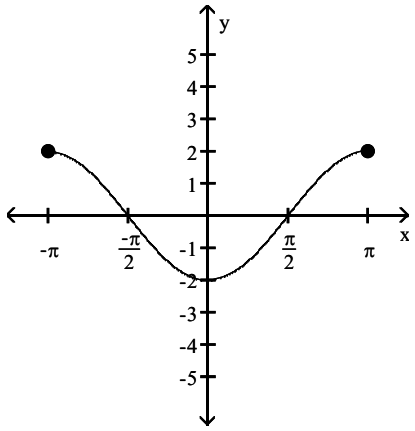
64)



A) (0, –1) B) (–1, 0) C) (0, 0) D) (–1, –1)

Answer: A

65)



A) $\left(0, -\frac{\pi}{2}\right)$, (0, –2), $\left(0, \frac{\pi}{2}\right)$

B) $\left(0, -\frac{\pi}{2}\right)$, (–2, 0), $\left(0, \frac{\pi}{2}\right)$

C) $\left(-\frac{\pi}{2}, 0\right)$, (–2, 0), $\left(\frac{\pi}{2}, 0\right)$

D) $\left(-\frac{\pi}{2}, 0\right)$, (0, –2), $\left(\frac{\pi}{2}, 0\right)$

Answer: D

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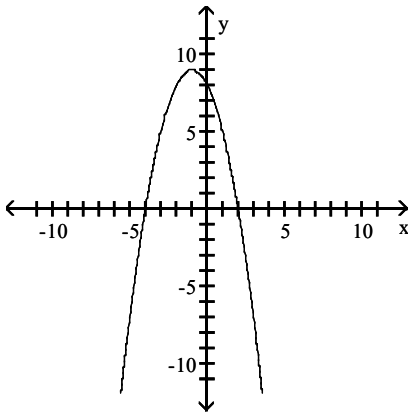
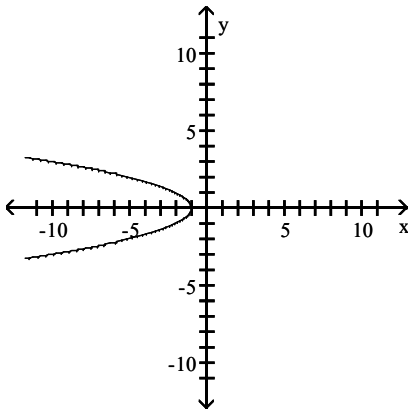
66)



A) (0, –4), (8, 0), (0, 2) B) (0, –4), (0, 8), (2, 0) C) (–4, 0), (0, 8), (2, 0) D) (–4, 0), (0, 8), (0, 2)

Answer: C

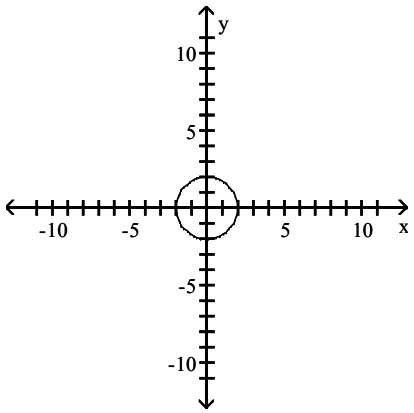
67)



A) (–1, 0) B) (1, 0) C) (0, –1) D) (0, 1)

Answer: A

68)



A) (–2, 0), (0, 2) B) (0, 2), (2, 0)
C) (–2, 0), (0, –2), (0, 2), (2, 0) D) (–2, 0), (0, –2), (0, 0), (0, 2), (2, 0)

Answer: C

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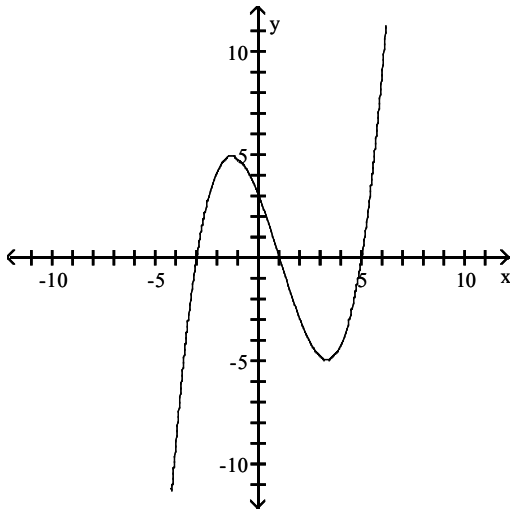
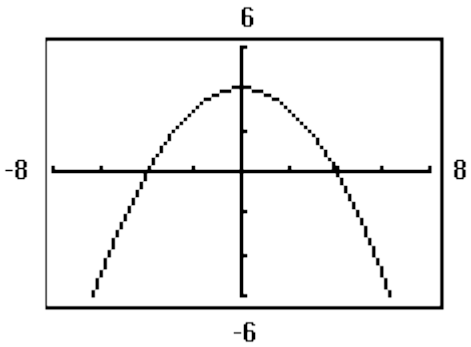
69)



A) (3, 0), (1, 0), (–5, 0), (0, 3)
B) (3, 0), (0, 3), (0, 1), (0, –5)
C) (3, 0), (0, –3), (0, 1), (0, 5)
D) (–3, 0), (1, 0) (5, 0), (0, 3)

Answer: D

70)



A) (–4, 0), (0, 4), (4, 0)
B) (–2, 0), (0, 4), (2, 0)
C) (–2, 0), (2, 0)
D) (–2, 0), (0, 2), (2, 0)

Answer: A

List the intercepts for the graph of the equation.

71) $y = x + 3$

A) (3, 0), (0, –3)
B) (3, 0), (0, 3)
C) (–3, 0), (0, –3)
D) (–3, 0), (0, 3)

Answer: D

72) $y = -2x$

A) (0, 0)
B) (–2, –2)
C) (–2, 0)
D) (0, –2)

Answer: A

73) $y^2 = x + 81$

A) (9, 0), (0, 81), (0, –81)
B) (–9, 0), (0, –81), (9, 0)
C) (0, –9), (81, 0), (0, 9)
D) (0, –9), (–81, 0), (0, 9)

Answer: D

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74) $y = \sqrt[6]{x}$

A) (1, 1) B) (0, 0) C) (0, 1) D) (1, 0)

Answer: B

75) $x^2 + y - 25 = 0$

A) (5, 0), (0, 25), (0, −25)
B) (0, −5), (25, 0), (0, 5)
C) (−5, 0), (0, −25), (5, 0)
D) (−5, 0), (0, 25), (5, 0)

Answer: D

76) $9x^2 + 16y^2 = 144$

A) (−16, 0), (0, −9), (0, 9), (16, 0)
B) (−9, 0), (−16, 0), (16, 0), (9, 0)
C) (−4, 0), (0, −3), (0, 3), (4, 0)
D) (−3, 0), (−4, 0), (4, 0), (3, 0)

Answer: C

77) $9x^2 + y^2 = 9$

A) (−3, 0), (0, −1), (0, 1), (3, 0)
B) (−1, 0), (0, −9), (0, 9), (1, 0)
C) (−9, 0), (0, −1), (0, 1), (9, 0)
D) (−1, 0), (0, −3), (0, 3), (1, 0)

Answer: D

78) $y = x^3 - 64$

A) (−64, 0), (0, 4) B) (0, −4), (0, 4) C) (0, −64), (4, 0) D) (0, −4), (−4, 0)

Answer: C

79) $y = x^4 - 16$

A) (0, 16)
B) (0, −16), (−2, 0), (2, 0)
C) (0, 16), (−2, 0), (2, 0)
D) (0, −16)

Answer: B

80) $y = x^2 + 6x + 9$

A) (3, 0), (3, 0), (0, 9) B) (0, −3), (0, −3), (9, 0) C) (0, 3), (0, 3), (9, 0) D) (−3, 0), (−3, 0), (0, 9)

Answer: D

81) $y = x^2 + 1$

A) (1, 0), (0, −1), (0, 1) B) (1, 0) C) (0, 1) D) (0, 1), (−1, 0), (1, 0)

Answer: C

82) $y = \dfrac{7x}{x^2 + 49}$

A) (0, −7), (0, 0), (0, 7)
B) (−49, 0), (0, 0), (49, 0)
C) (0, 0)
D) (−7, 0), (0, 0), (7, 0)

Answer: C

83) $y = \dfrac{x^2 - 16}{4x^4}$

A) (−4, 0), (4, 0)
B) (−16, 0), (0, 0), (16, 0)
C) (0, −4), (0, 4)
D) (0, 0)

Answer: A

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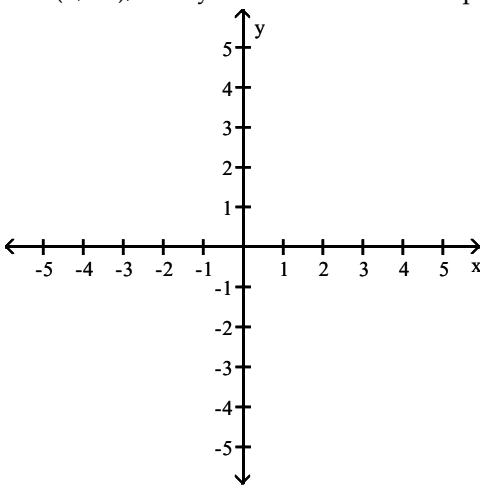
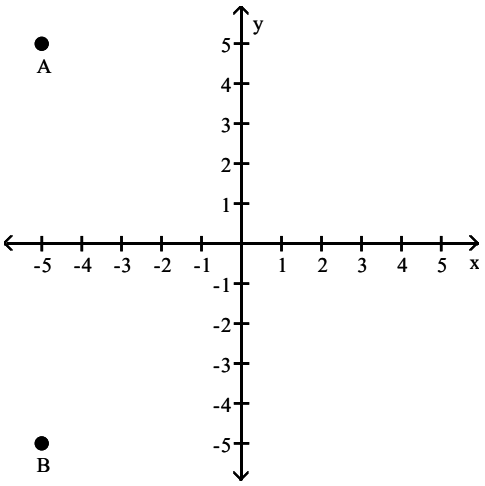
Plot the point A. Plot the point B that has the given symmetry with point A.

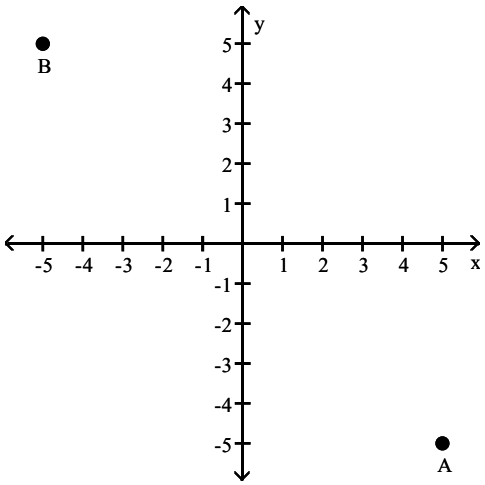
84) A = (5, –5); B is symmetric to A with respect to the x–axis



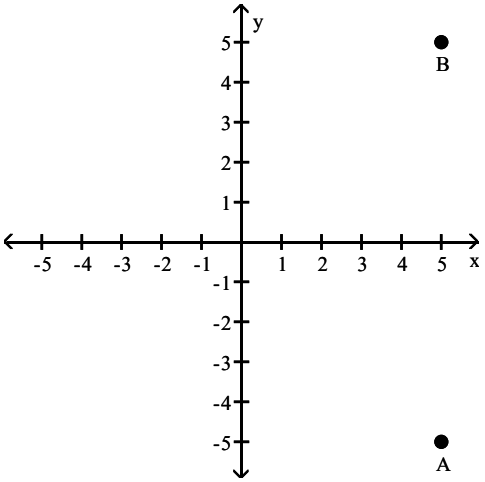
A)



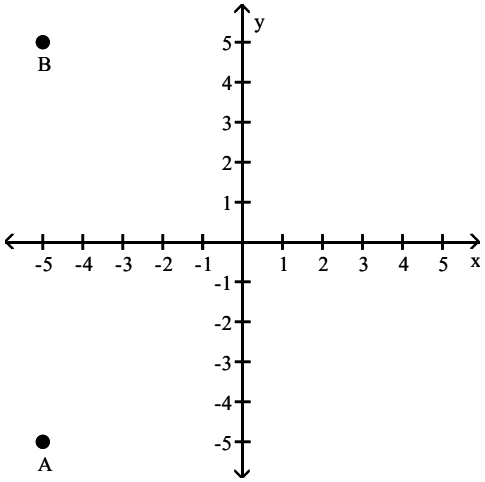
B)



C)



D)



Answer: C

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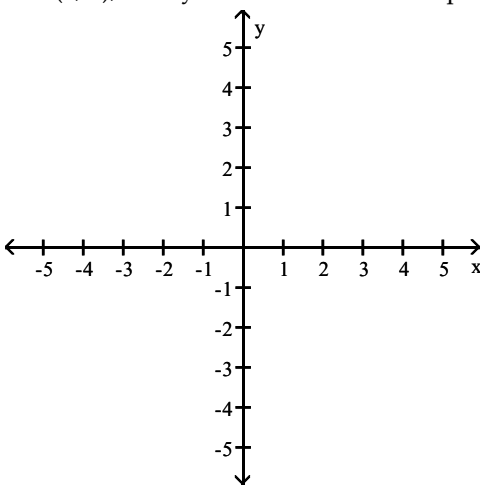
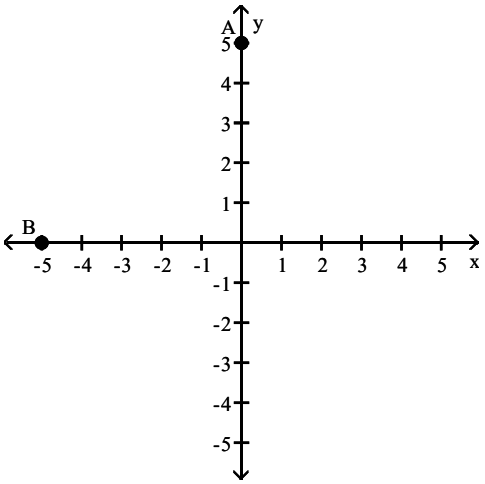
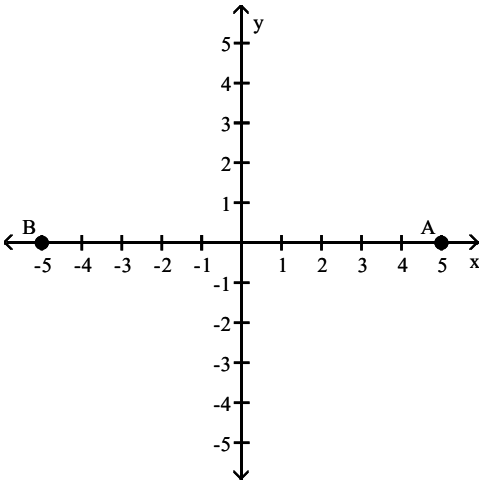
85) A = (0, 5); B is symmetric to A with respect to the origin



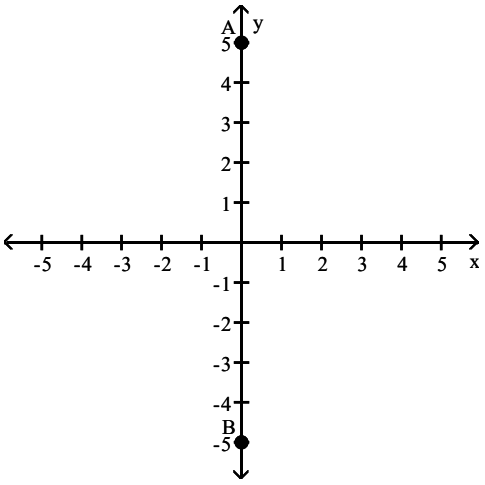
A)



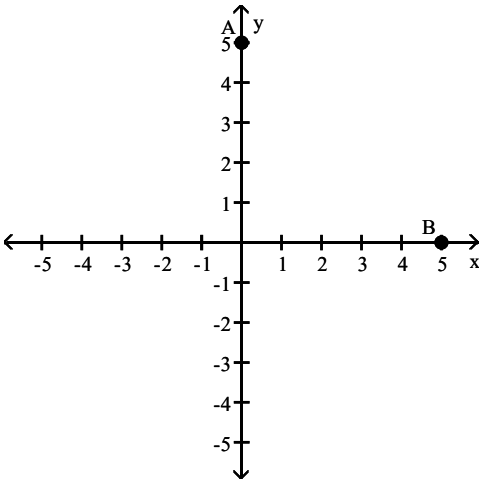
B)



C)



D)



Answer: C

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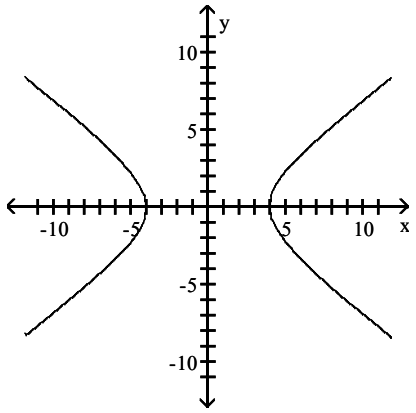
List the intercepts of the graph.Tell whether the graph is symmetric with respect to the x–axis, y–axis, origin, or none of these.

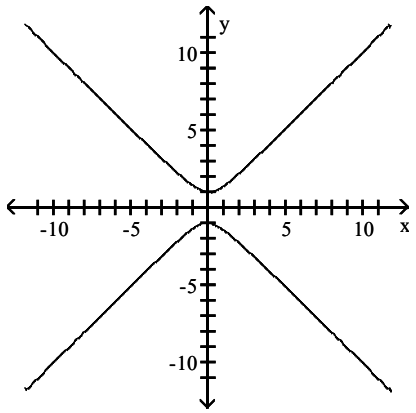
86)



A) intercepts: (0, –4) and (0, 4)
symmetric with respect to y–axis
B) intercepts: (0, –4) and (0, 4)
symmetric with respect to x–axis, y–axis, and origin
C) intercepts: (–4, 0) and (4, 0)
symmetric with respect to origin
D) intercepts: (–4, 0) and (4, 0)
symmetric with respect to x–axis, y–axis, and origin

Answer: D

87)



A) intercepts: (1, 0) and (–1, 0)
symmetric with respect to x–axis, y–axis, and origin
B) intercepts: (0, 1) and (0, –1)
symmetric with respect to origin
C) intercepts: (1, 0) and (–1, 0
symmetric with respect to y–axis
D) intercepts: (0, 1) and (0, –1)
symmetric with respect to x–axis, y–axis, and origin

Answer: D

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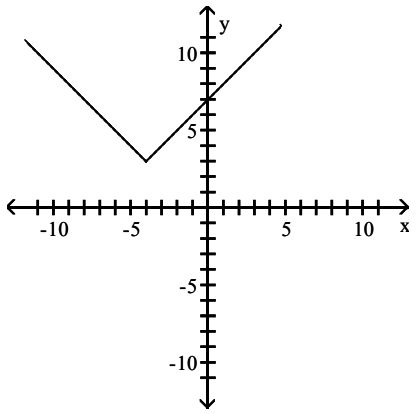
88)



A) intercept: (0, 7)
symmetric with respect to x-axis

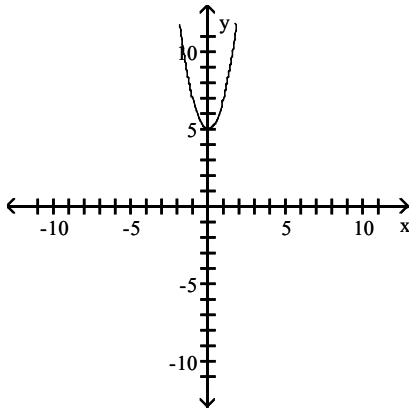
B) intercept: (0, 7)
no symmetry

C) intercept: (7, 0)
no symmetry

D) intercept: (7, 0)
symmetric with respect to y-axis

Answer: B

89)



A) intercept: (5, 0)
symmetric with respect to y-axis

B) intercept: (0, 5)
symmetric with respect to y-axis

C) intercept: (0, 5)
symmetric with respect to origin

D) intercept: (5, 0)
symmetric with respect to x-axis

Answer: B

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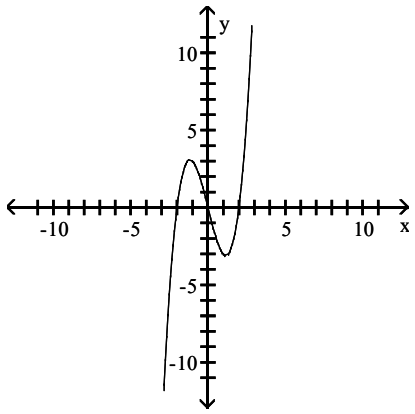
90)

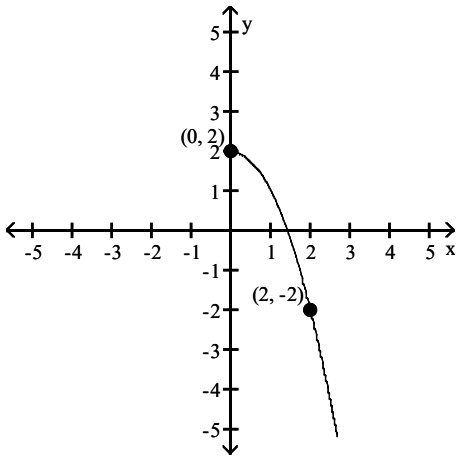


A) intercepts: (–2, 0), (0, 0), (2, 0)
symmetric with respect to origin
B) intercepts: (–2, 0), (0, 0), (2, 0)
symmetric with respect to x–axis
C) intercepts: (–2, 0), (0, 0), (2, 0)
symmetric with respect to x–axis, y–axis, and origin
D) intercepts: (–2, 0), (0, 0), (2, 0)
symmetric with respect to y–axis

Answer: A

Draw a complete graph so that it has the given type of symmetry.

91) Symmetric with respect to the y–axis



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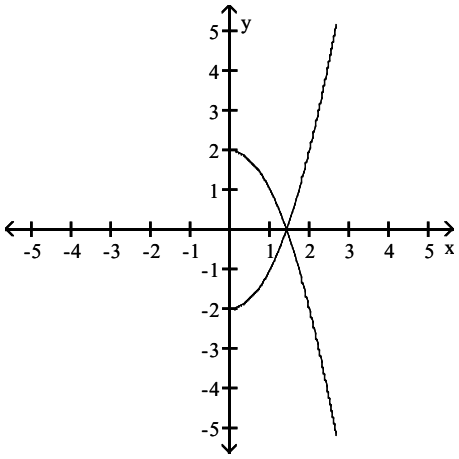
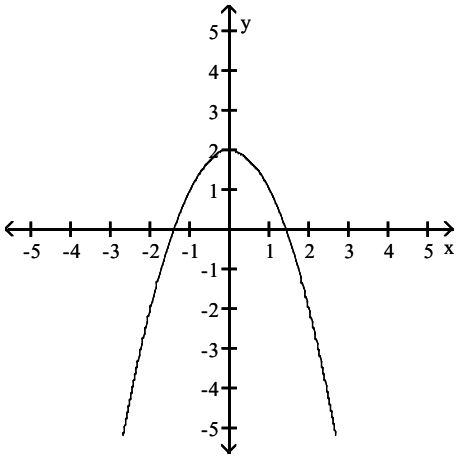
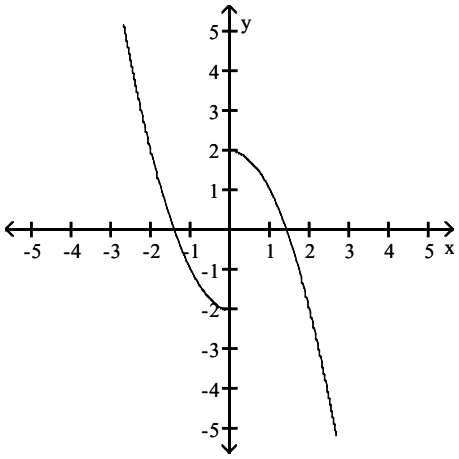
A)



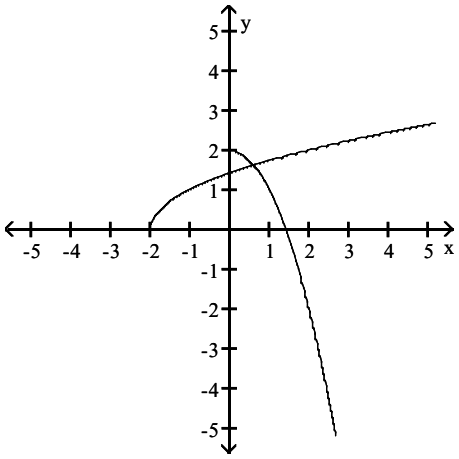
B)



C)

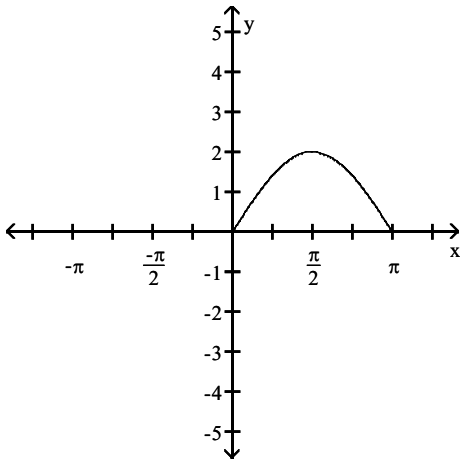


D)



Answer: B

92) origin



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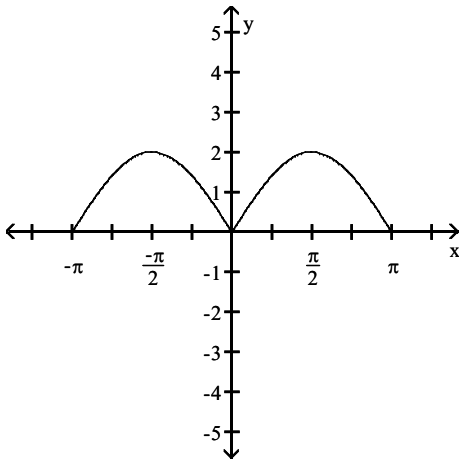
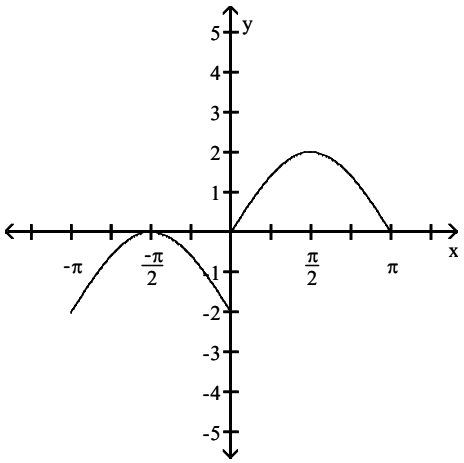
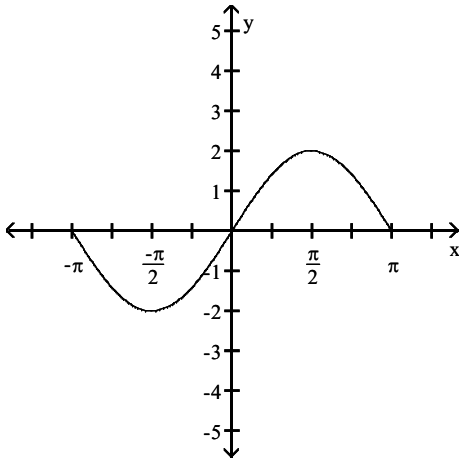
A)



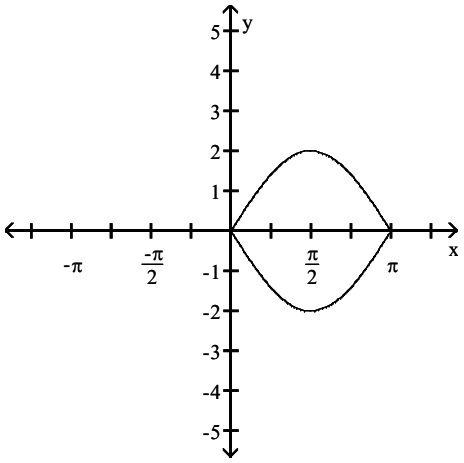
B)



C)

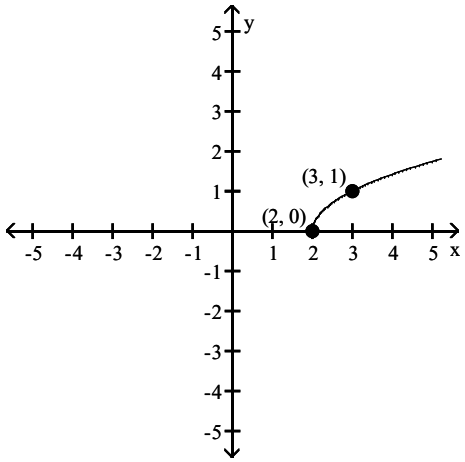


D)



Answer: C

93) Symmetric with respect to the x–axis



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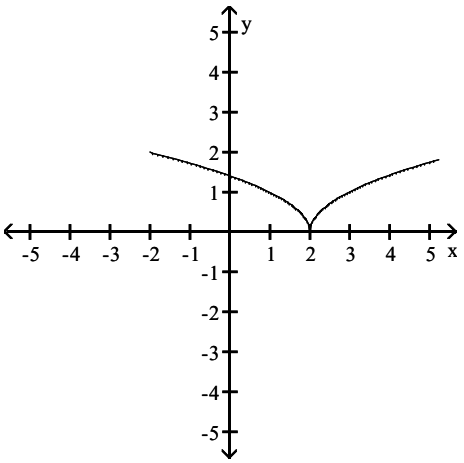
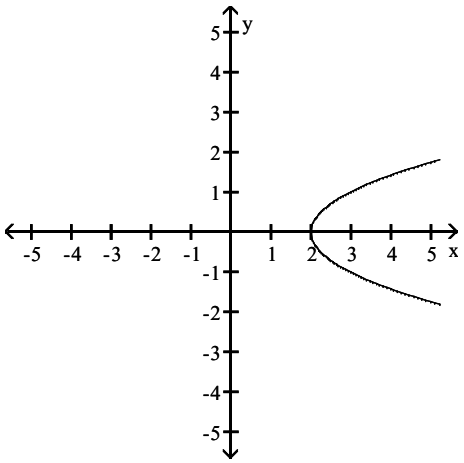
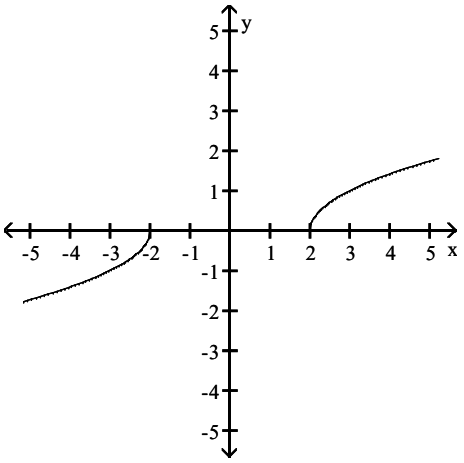
A)



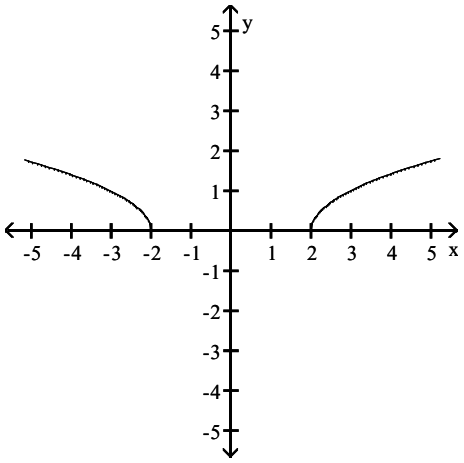
B)



C)



D)



Answer: B

List the intercepts and type(s) of symmetry, if any.

94) $y^2 = x + 9$

A) intercepts: (0, –9), (3, 0), (–3, 0)
symmetric with respect to y–axis

B) intercepts: (9, 0), (0, 3), (0, –3)
symmetric with respect to x–axis

C) intercepts: (0, 9), (3, 0), (–3, 0)
symmetric with respect to y–axis

D) intercepts: (–9, 0), (0, 3), (0, –3)
symmetric with respect to x–axis

Answer: D

95) $4x^2 + 9y^2 = 36$

A) intercepts: (3, 0), (–3, 0), (0, 2), (0, –2)
symmetric with respect to x–axis, y–axis, and origin

B) intercepts: (2, 0), (–2, 0), (0, 3), (0, –3)
symmetric with respect to the origin

C) intercepts: (3, 0), (–3, 0), (0, 2), (0, –2)
symmetric with respect to x–axis and y–axis

D) intercepts: (2, 0), (–2, 0), (0, 3), (0, –3)
symmetric with respect to x–axis and y–axis

Answer: A

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96) $y = \dfrac{-x^3}{x^2 - 7}$

A) intercept: (0, 0)
symmetric with respect to x–axis

B) intercept: (0, 0)
symmetric with respect to y–axis

C) intercept: (0, 0)
symmetric with respect to origin

D) intercepts: $(\sqrt{7}, 0)$, $(-\sqrt{7}, 0)$, (0, 0)
symmetric with respect to origin

Answer: C

Determine whether the graph of the equation is symmetric with respect to the x–axis, the y–axis, and/or the origin.

97) $y = x + 5$

A) origin
B) y–axis
C) x–axis
D) x–axis, y–axis, origin
E) none

Answer: E

98) $y = 3x$

A) y–axis
B) origin
C) x–axis
D) x–axis, y–axis, origin
E) none

Answer: B

99) $x^2 + y - 25 = 0$

A) origin
B) x–axis
C) y–axis
D) x–axis, y–axis, origin
E) none

Answer: C

100) $y^2 - x - 64 = 0$

A) y–axis
B) origin
C) x–axis
D) x–axis, y–axis, origin
E) none

Answer: C

101) $4x^2 + 16y^2 = 64$

A) y–axis
B) origin
C) x–axis
D) x–axis, y–axis, origin
E) none

Answer: D

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102) $4x^2 + y^2 = 4$

A) y–axis
B) x–axis
C) origin
D) x–axis, y–axis, origin
E) none

Answer: D

103) $y = x^2 + 16x + 64$

A) y–axis
B) x–axis
C) origin
D) x–axis, y–axis, origin
E) none

Answer: E

104) $y = \dfrac{8x}{x^2 + 64}$

A) y–axis
B) x–axis
C) origin
D) x–axis, y–axis, origin
E) none

Answer: C

105) $y = \dfrac{x^2 - 9}{3x^4}$

A) y–axis
B) origin
C) x–axis
D) x–axis, y–axis, origin
E) none

Answer: A

106) $y = 3x^2 + 5$

A) origin
B) y–axis
C) x–axis
D) x–axis, y–axis, origin
E) none

Answer: B

107) $y = (x - 4)(x - 9)$

A) x–axis
B) origin
C) y–axis
D) x–axis, y–axis, origin
E) none

Answer: E

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108) $y = -5x^3 + 5x$

A) x–axis
B) origin
C) y–axis
D) x–axis, y–axis, origin
E) none

Answer: B

109) $y = -6x^4 - 6x - 7$

A) x–axis
B) origin
C) y–axis
D) x–axis, y–axis, origin
E) none

Answer: E

Solve the problem.

110) If a graph is symmetric with respect to the y–axis and it contains the point (5, –6), which of the following points is also on the graph?

A) (–5, 6) B) (–6, 5) C) (5, –6) D) (–5, –6)

Answer: A

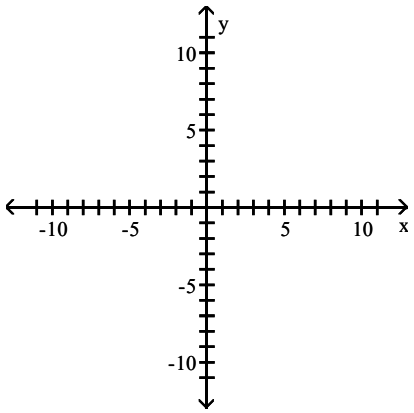
111) If a graph is symmetric with respect to the origin and it contains the point (–4, 7), which of the following points is also on the graph?

A) (4, –7) B) (–4, –7) C) (7, –4) D) (4, 7)

Answer: A

Graph the equation by plotting points.

112) $y = x^3$



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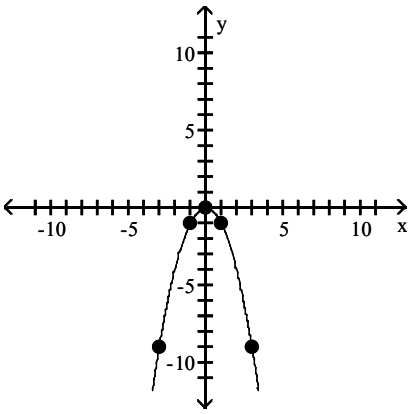
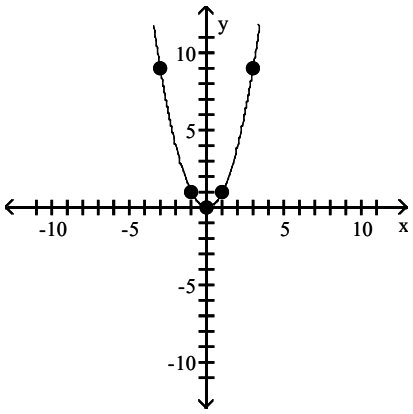
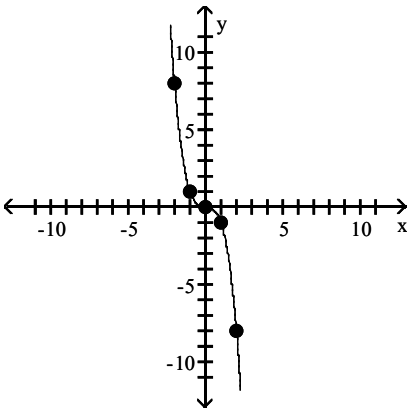
A)



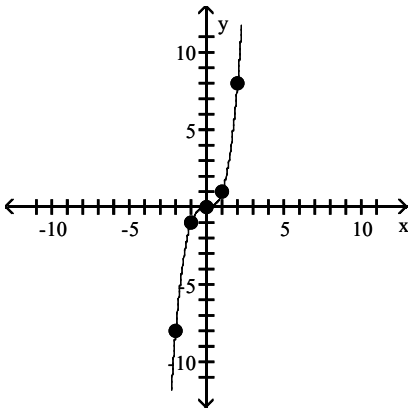
B)



C)

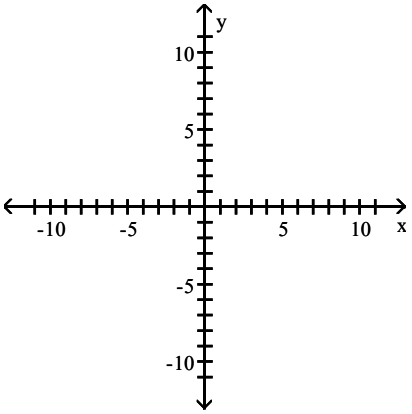


D)



Answer: D

113) $x = y^2$



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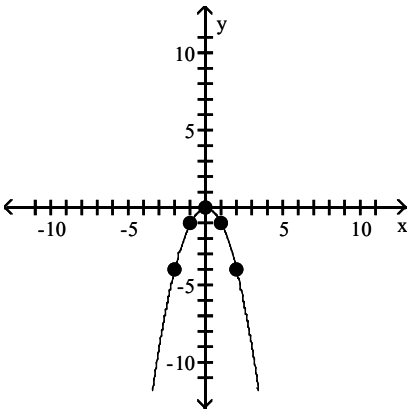
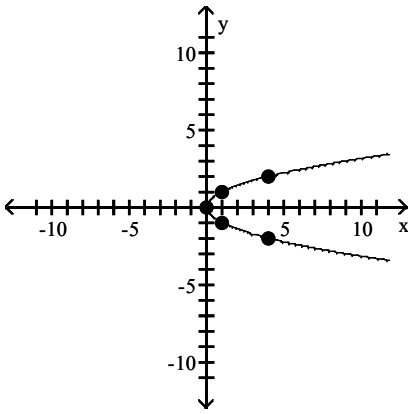
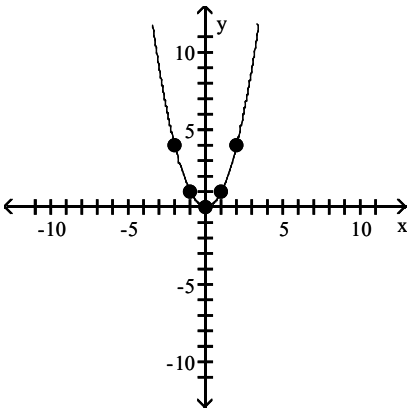
A)



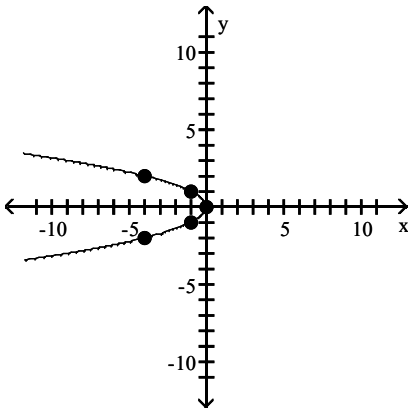
B)



C)

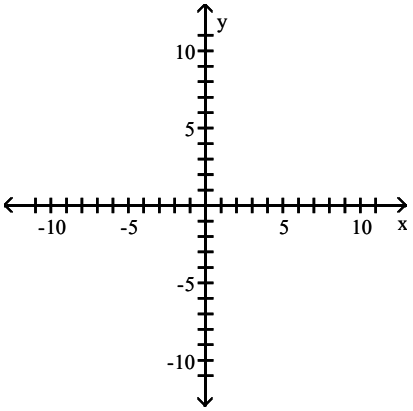


D)



Answer: B

114) $y = \sqrt{x}$



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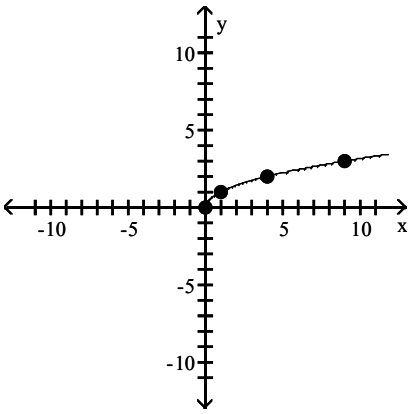
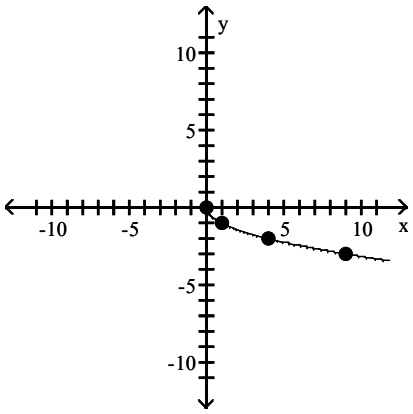
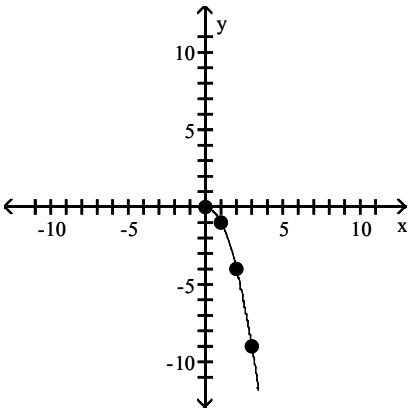
A)



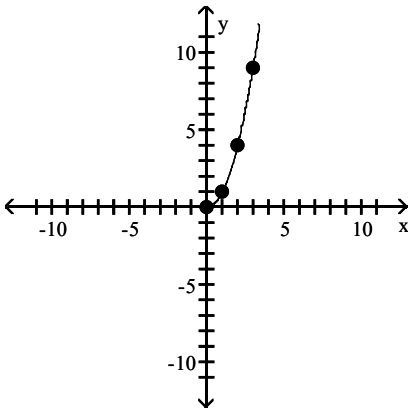
B)



C)

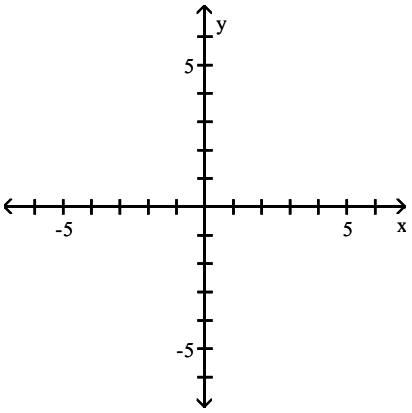


D)



Answer: A

115) $y = \frac{1}{x}$



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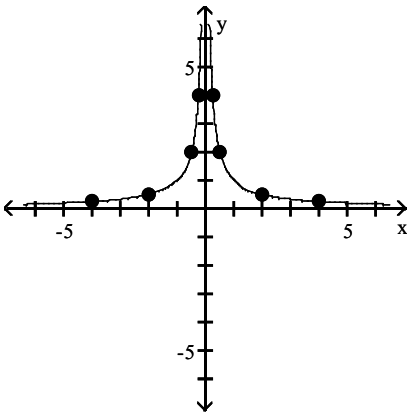
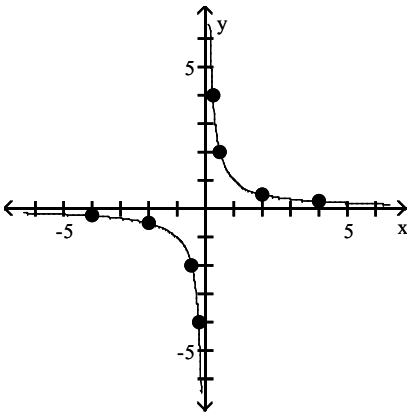
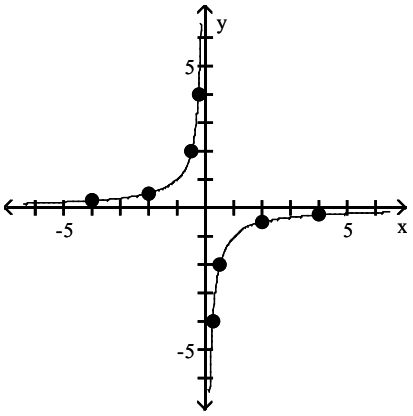
A)



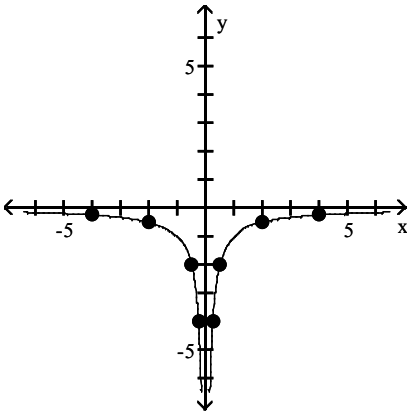
B)



C)



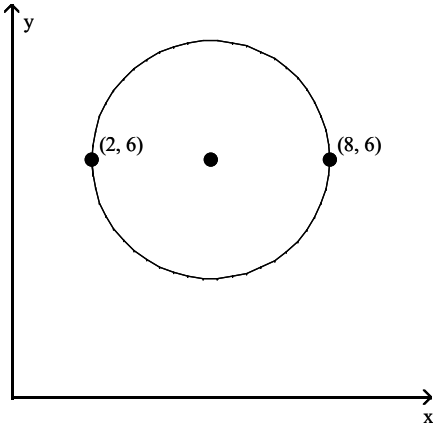
D)



Answer: B

Write the standard form of the equation of the circle.

116)



A) $(x + 5)^2 + (y + 6)^2 = 9$

B) $(x - 5)^2 + (y - 6)^2 = 9$

C) $(x - 5)^2 + (y - 6)^2 = 3$

D) $(x + 5)^2 + (y + 6)^2 = 3$

Answer: B

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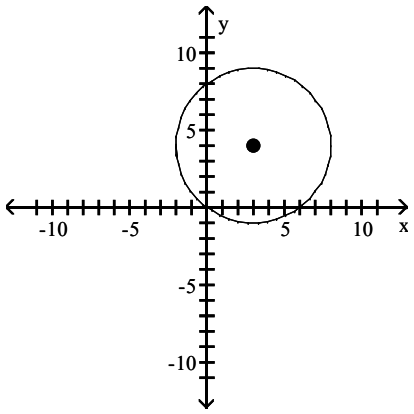
117)



A) $(x - 3)^2 + (y - 4)^2 = 25$
B) $(x + 4)^2 + (y + 3)^2 = 25$
C) $(x - 4)^2 + (y - 3)^2 = 25$
D) $(x + 3)^2 + (y + 4)^2 = 25$

Answer: A

Write the standard form of the equation of the circle with radius r and center (h, k).

118) $r = 3$; $(h, k) = (0, 0)$

A) $x^2 + y^2 = 3$
B) $x^2 + y^2 = 9$
C) $(x - 3)^2 + (y - 3)^2 = 3$
D) $(x - 3)^2 + (y - 3)^2 = 9$

Answer: B

119) $r = 2$; $(h, k) = (4, -1)$

A) $(x - 4)^2 + (y + 1)^2 = 4$
B) $(x - 4)^2 + (y + 1)^2 = 2$
C) $(x + 4)^2 + (y - 1)^2 = 4$
D) $(x + 4)^2 + (y - 1)^2 = 2$

Answer: A

120) $r = 10$; $(h, k) = (-8, 0)$

A) $x^2 + (y - 8)^2 = 10$
B) $x^2 + (y + 8)^2 = 10$
C) $(x + 8)^2 + y^2 = 100$
D) $(x - 8)^2 + y^2 = 100$

Answer: C

121) $r = 11$; $(h, k) = (0, 6)$

A) $(x - 6)^2 + y^2 = 121$
B) $x^2 + (y - 6)^2 = 121$
C) $(x + 6)^2 + y^2 = 121$
D) $x^2 + (y + 6)^2 = 11$

Answer: B

122) $r = \sqrt{13}$; $(h, k) = (5, -6)$

A) $(x - 6)^2 + (y + 5)^2 = 169$
B) $(x + 6)^2 + (y - 5)^2 = 169$
C) $(x - 5)^2 + (y + 6)^2 = 13$
D) $(x + 5)^2 + (y - 6)^2 = 13$

Answer: C

123) $r = \sqrt{14}$; $(h, k) = (0, 1)$

A) $x^2 + (y - 1)^2 = 14$
B) $(x + 1)^2 + y^2 = 196$
C) $(x - 1)^2 + y^2 = 196$
D) $x^2 + (y + 1)^2 = 14$

Answer: A

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Solve the problem.

124) Find the equation of a circle in standard form where C(6, –2) and D(–4, 4) are endpoints of a diameter.

A) $(x - 1)^2 + (y - 1)^2 = 34$ B) $(x - 1)^2 + (y - 1)^2 = 136$

C) $(x + 1)^2 + (y + 1)^2 = 136$ D) $(x + 1)^2 + (y + 1)^2 = 34$

Answer: A

125) Find the equation of a circle in standard form with center at the point (–3, 2) and tangent to the line y = 4.

A) $(x + 3)^2 + (y - 2)^2 = 16$ B) $(x + 3)^2 + (y - 2)^2 = 4$

C) $(x - 3)^2 + (y + 2)^2 = 4$ D) $(x - 3)^2 + (y + 2)^2 = 16$

Answer: B

126) Find the equation of a circle in standard form that is tangent to the line x = –3 at (–3, 5) and also tangent to the line x = 9.

A) $(x + 3)^2 + (y - 5)^2 = 36$ B) $(x - 3)^2 + (y + 5)^2 = 36$

C) $(x + 3)^2 + (y + 5)^2 = 36$ D) $(x - 3)^2 + (y - 5)^2 = 36$

Answer: D

Find the center (h, k) and radius r of the circle with the given equation.

127) $x^2 + y^2 = 9$

A) (h, k) = (0, 0); r = 9 B) (h, k) = (3, 3); r = 9 C) (h, k) = (3, 3); r = 3 D) (h, k) = (0, 0); r = 3

Answer: D

128) $(x - 9)^2 + (y + 3)^2 = 4$

A) (h, k) = (9, –3); r = 2 B) (h, k) = (–3, 9); r = 2

C) (h, k) = (–3, 9); r = 4 D) (h, k) = (9, –3); r = 4

Answer: A

129) $(x + 4)^2 + y^2 = 16$

A) (h, k) = (–4, 0); r = 16 B) (h, k) = (–4, 0); r = 4

C) (h, k) = (0, –4); r = 16 D) (h, k) = (0, –4); r = 4

Answer: B

130) $x^2 + (y + 1)^2 = 100$

A) (h, k) = (–1, 0); r = 100 B) (h, k) = (0, –1); r = 100

C) (h, k) = (–1, 0); r = 10 D) (h, k) = (0, –1); r = 10

Answer: D

131) $5(x + 5)^2 + 5(y - 3)^2 = 75$

A) (h, k) = (–5, 3); $r = 5\sqrt{15}$ B) (h, k) = (–5, 3); $r = \sqrt{15}$

C) (h, k) = (5, –3); $r = \sqrt{15}$ D) (h, k) = (5, –3); $r = 5\sqrt{15}$

Answer: B

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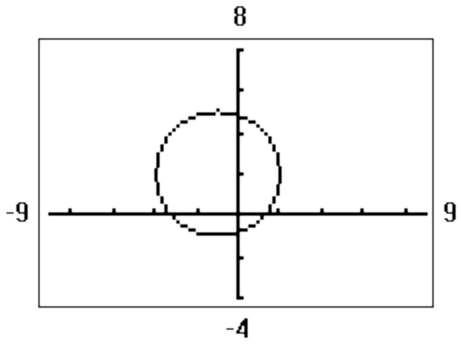
Solve the problem.

132) Find the standard form of the equation of the circle. Assume that the center has integer coordinates and the radius is an integer.



A) $(x - 1)^2 + (y + 2)^2 = 9$

B) $x^2 + y^2 + 2x - 4y - 4 = 0$

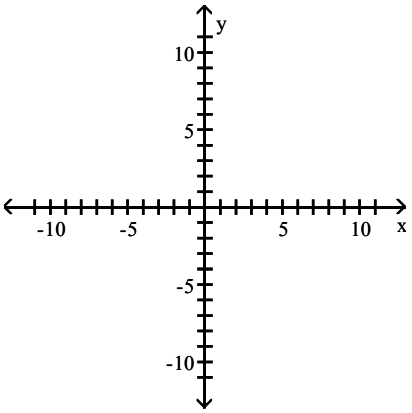
C) $x^2 + y^2 - 2x + 4y - 4 = 0$

D) $(x + 1)^2 + (y - 2)^2 = 9$

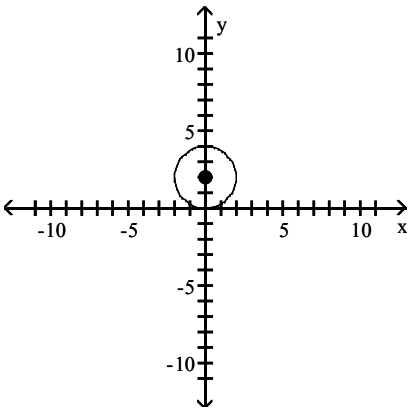
Answer: D

Graph the circle with radius r and center (h, k).

133) r = 2; (h, k) = (0, 0)



A)



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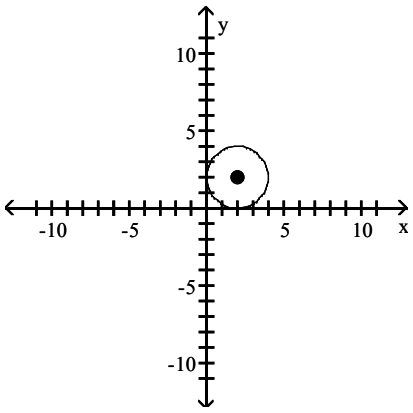

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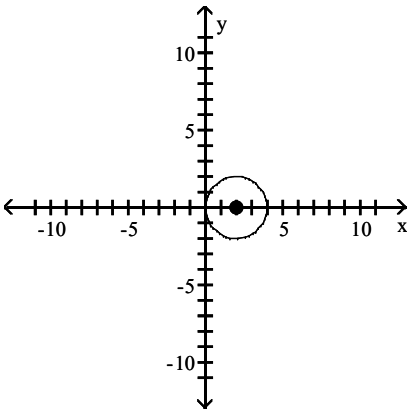
C)



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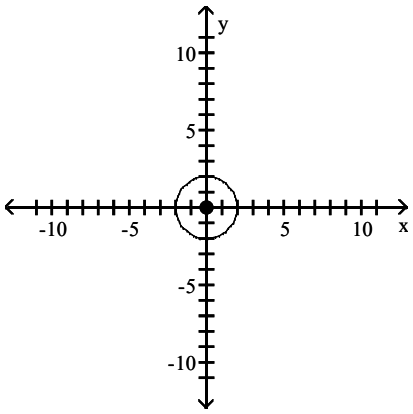
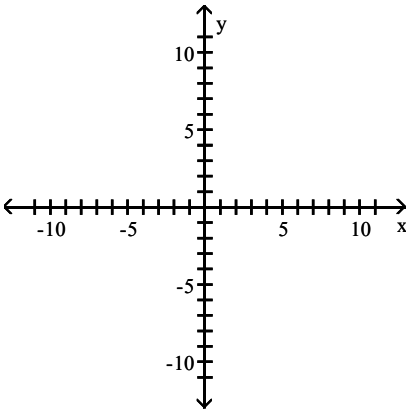
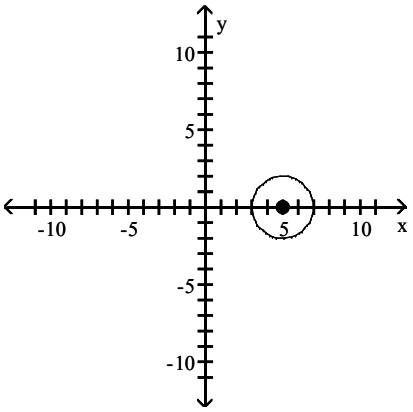


Answer: D

134) r = 2; (h, k) = (0, 5)



A)



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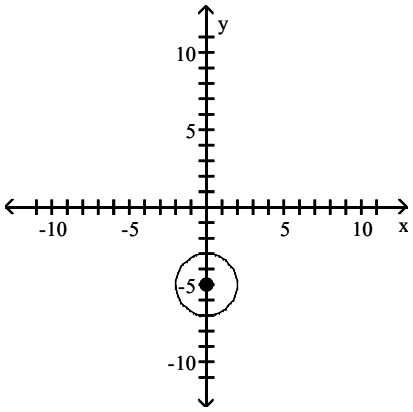

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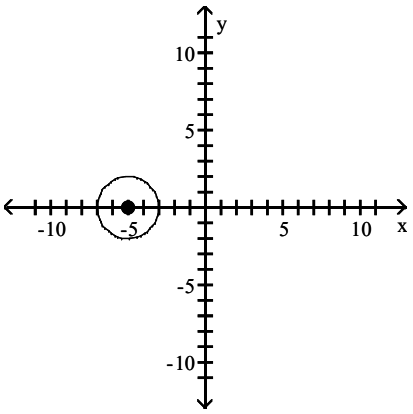
C)



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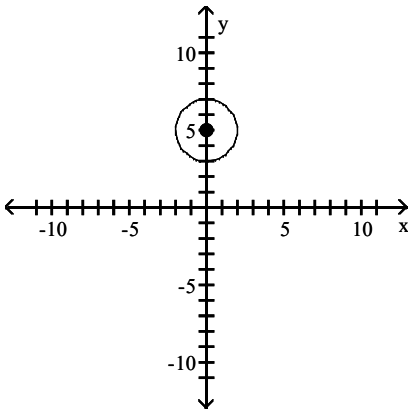
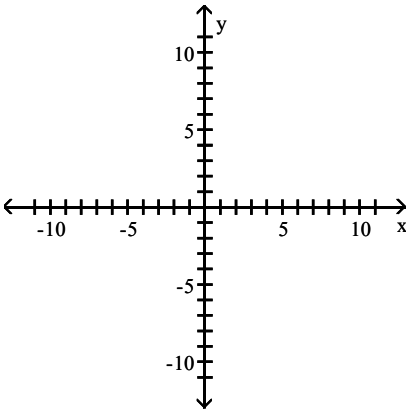
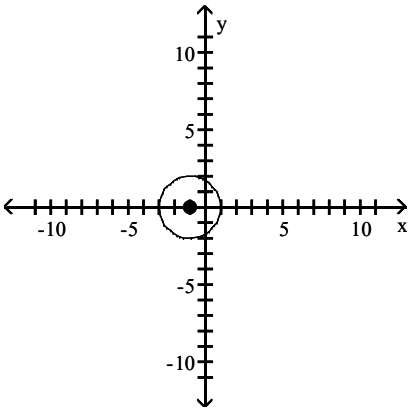


Answer: D

135) r = 2; (h, k) = (1, 0)



A)



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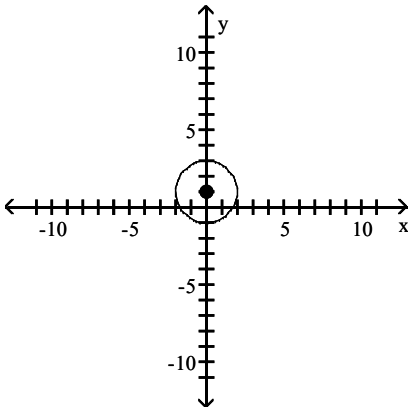

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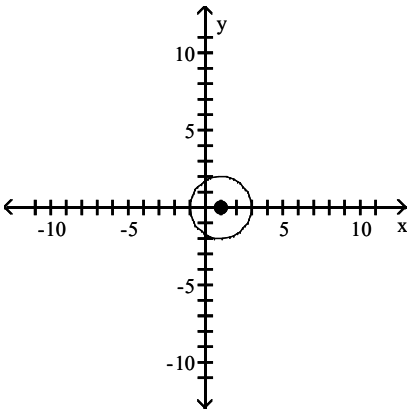
C)



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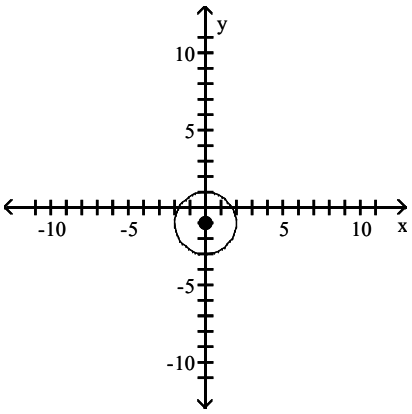
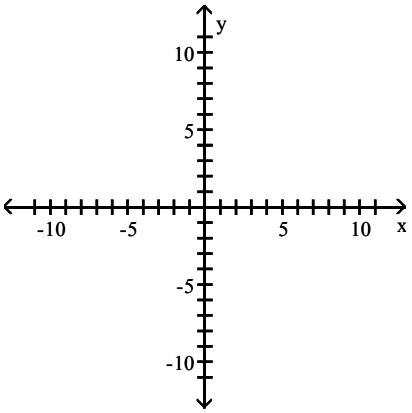
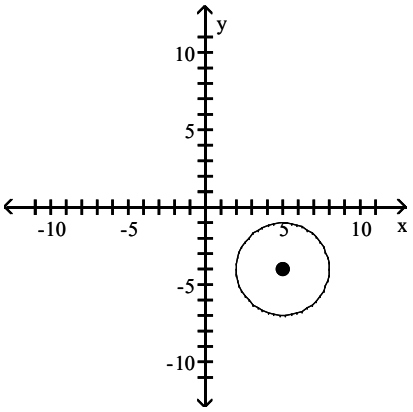


Answer: C

136) r = 3; (h, k) = (5, 4)



A)



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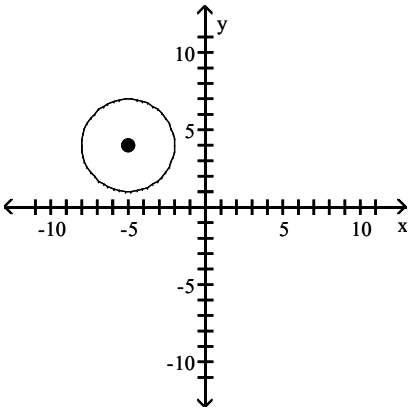

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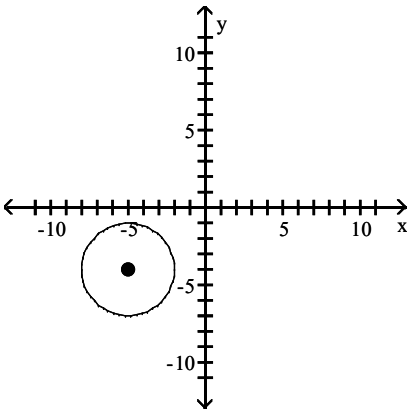
C)



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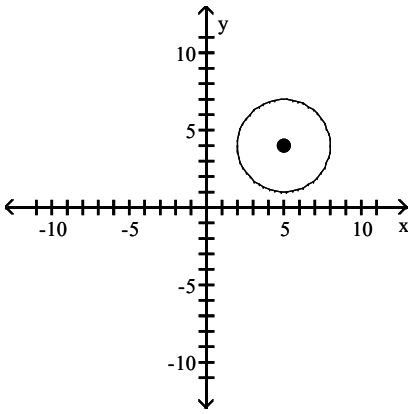
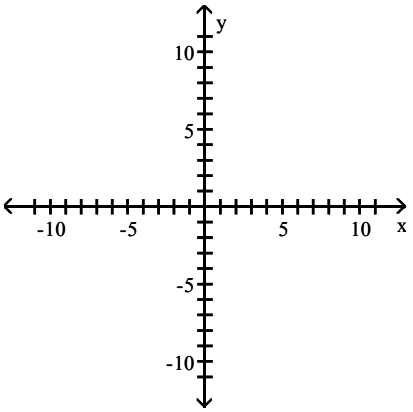


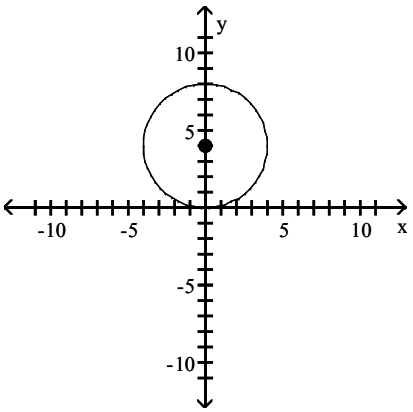
Answer: D

Graph the equation.

137) $x^2 + y^2 = 16$



A)



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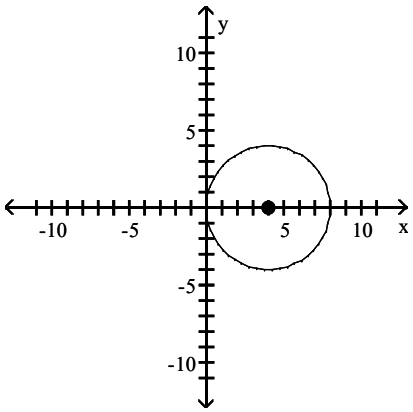

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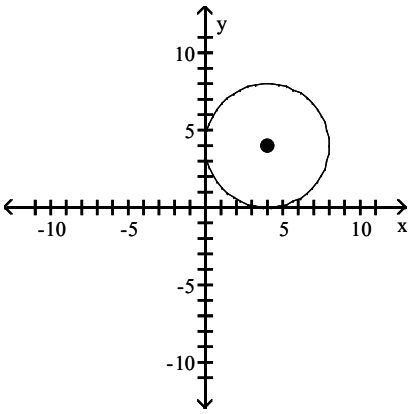
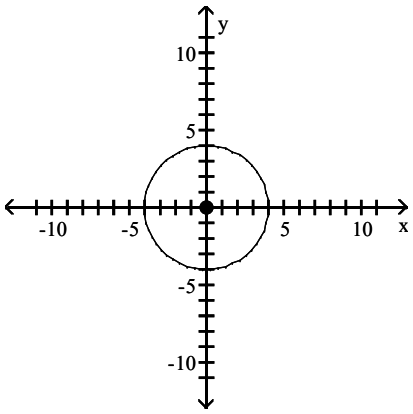
C)

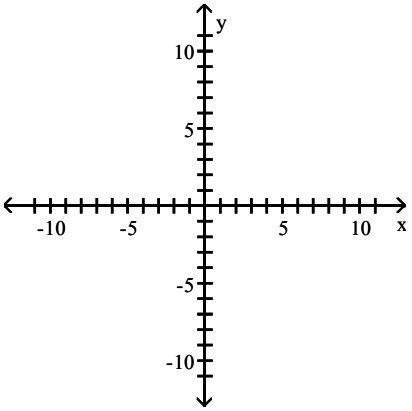


D)

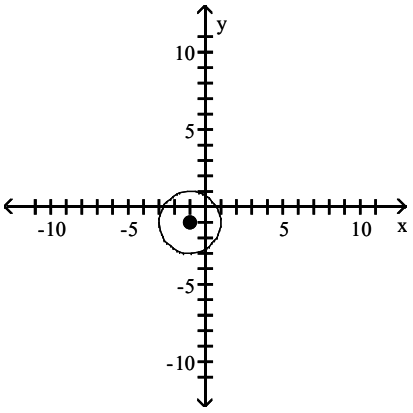


Answer: D

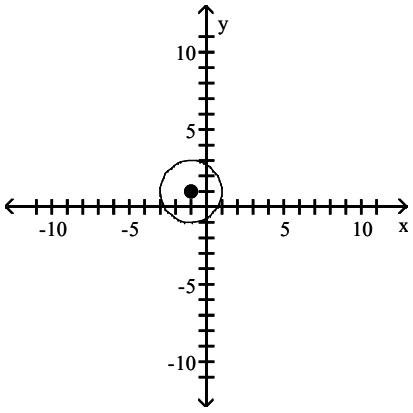
138) $(x - 1)^2 + (y + 1)^2 = 4$



A)



B)



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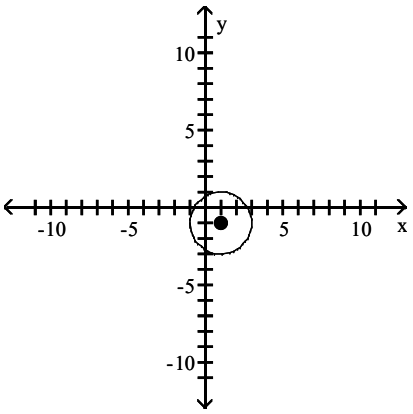
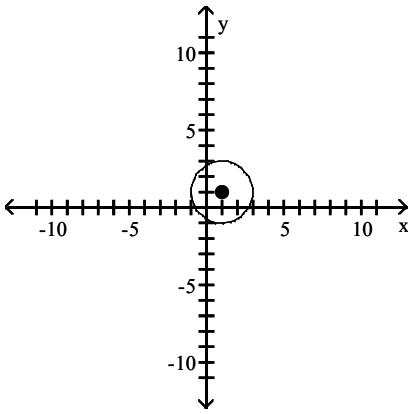
C)

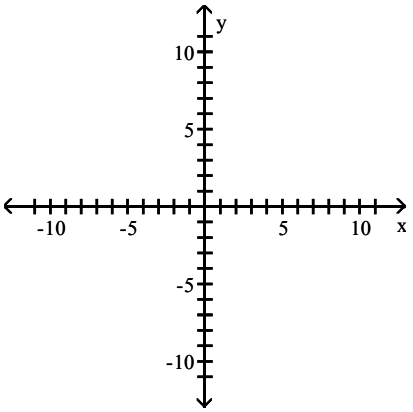


D)

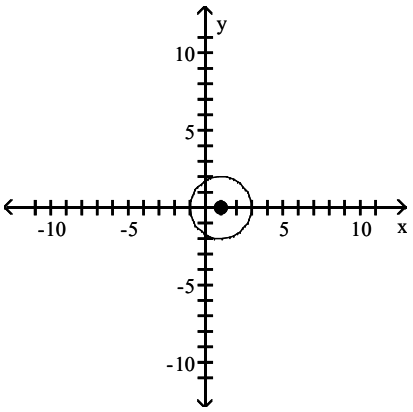


Answer: C

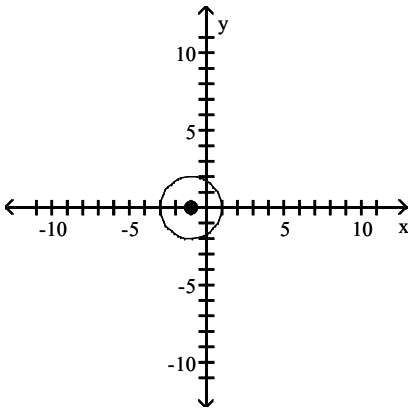
139) $x^2 + (y - 1)^2 = 4$



A)



B)



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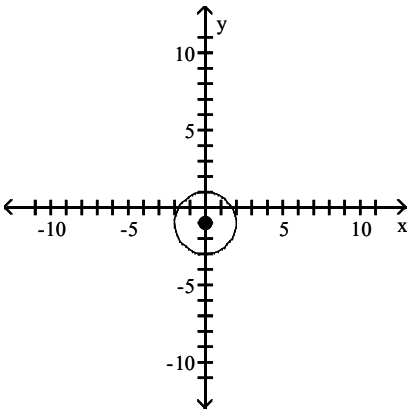
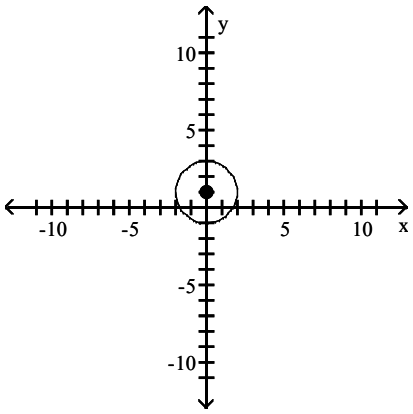
C)

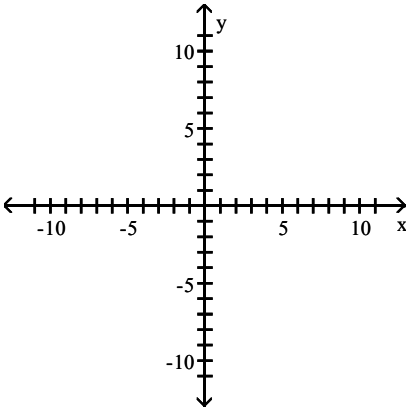


D)

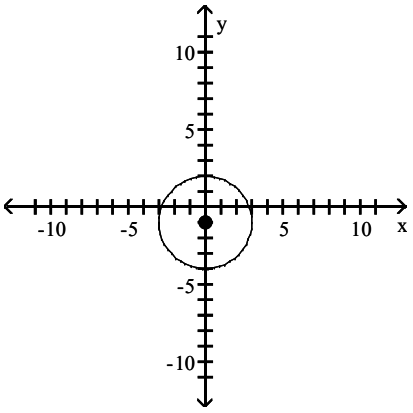


Answer: D

140) $(x - 1)^2 + y^2 = 9$



A)



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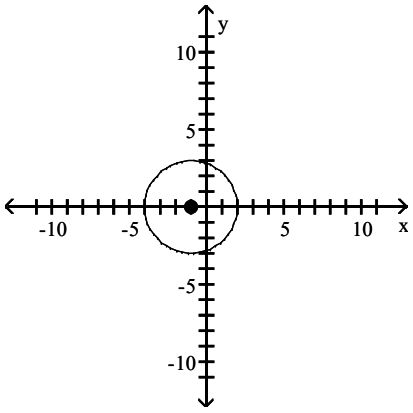

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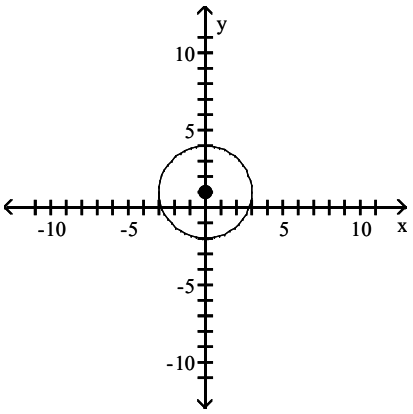
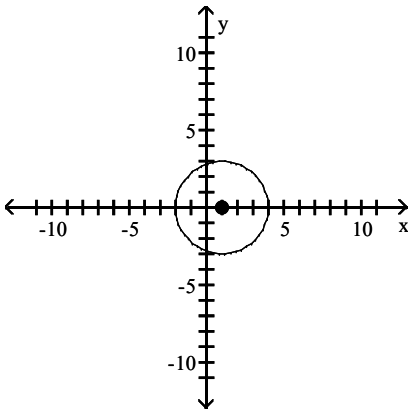
C)



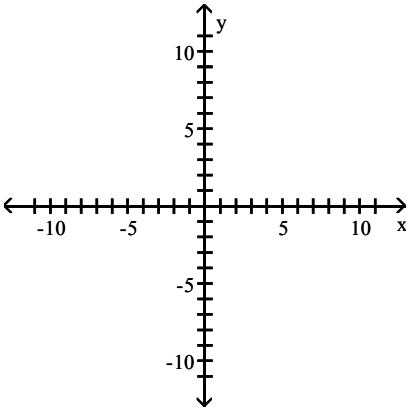
D)



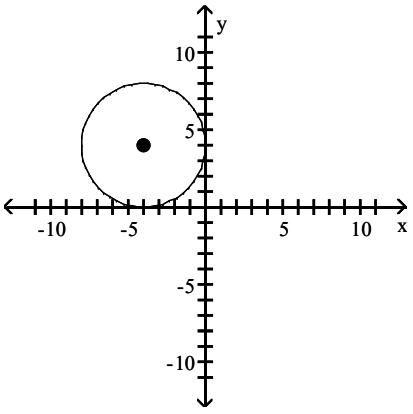
Answer: D

Find the center (h, k) and radius r of the circle. Graph the circle.

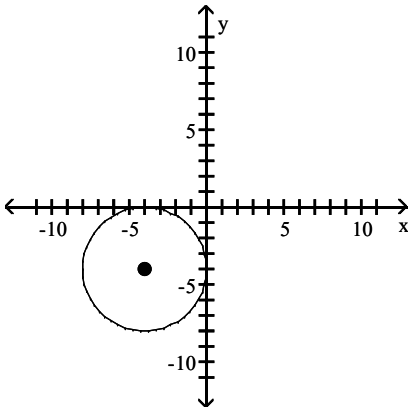
141) $x^2 + y^2 - 8x - 8y + 16 = 0$



A) (h, k) = (−4, 4); r = 4



B) (h, k) = (−4, −4); r = 4



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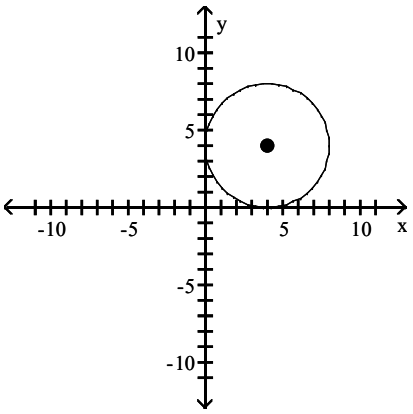
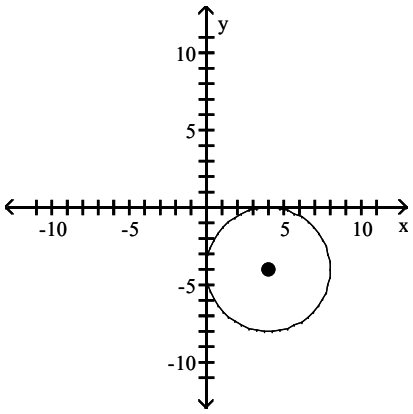
C) (h, k) = (4, 4); r = 4

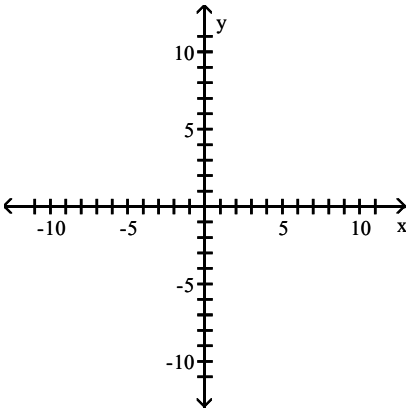


D) (h, k) = (4, –4); r = 4

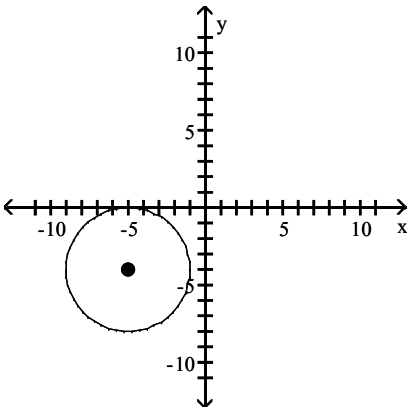


Answer: C

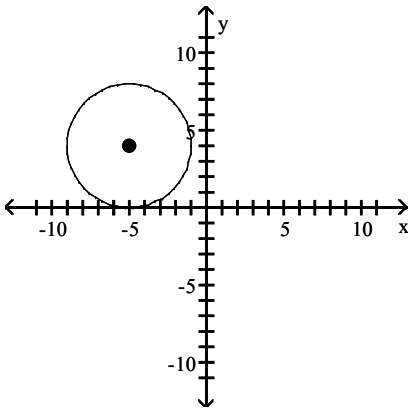
142) $x^2 + y^2 + 10x + 8y + 25 = 0$



A) (h, k) = (–5, –4); r = 4



B) (h, k) = (–5, 4); r = 4



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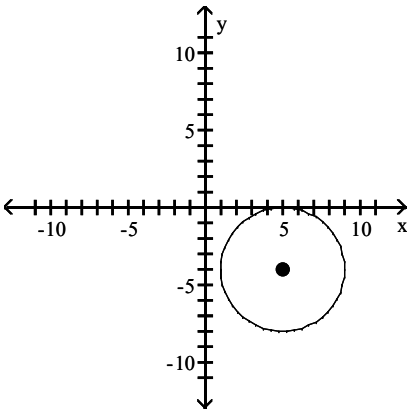
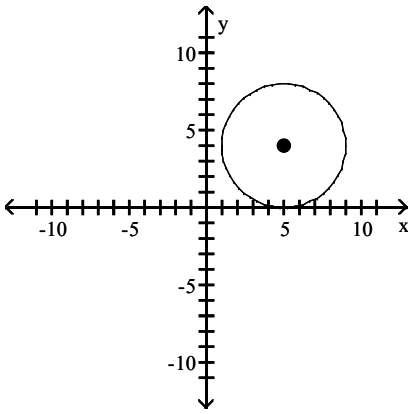
C) (h, k) = (5, –4); r = 4



D) (h, k) = (5, 4); r = 4



Answer: A

Find the center (h, k) and radius r of the circle with the given equation.

143) $x^2 - 2x + 1 + (y - 5)^2 = 64$

A) (h, k) = (1, 5); r = 8
B) (h, k) = (5, 1); r = 8
C) (h, k) = (–5, –1); r = 64
D) (h, k) = (–1, –5); r = 64

Answer: A

144) $x^2 + 6x + 9 + y^2 - 8y + 16 = 49$

A) (h, k) = (4, –3); r = 7
B) (h, k) = (–3, 4); r = 7
C) (h, k) = (3, –4); r = 49
D) (h, k) = (–4, 3); r = 49

Answer: B

145) $x^2 + y^2 - 2x - 14y + 50 = 25$

A) (h, k) = (–1, –7); r = 25
B) (h, k) = (–7, –1); r = 25
C) (h, k) = (7, 1); r = 5
D) (h, k) = (1, 7); r = 5

Answer: D

146) $x^2 + y^2 + 10x + 2y = -1$

A) (h, k) = (–1, –5); r = 5
B) (h, k) = (–5, –1); r = 5
C) (h, k) = (5, 1); r = 25
D) (h, k) = (1, 5); r = 25

Answer: B

147) $4x^2 + 4y^2 - 12x + 16y - 5 = 0$

A) (h, k) = $(\frac{3}{2}, -2)$; r = $\frac{3\sqrt{5}}{2}$
B) (h, k) = $(\frac{3}{2}, -2)$; r = $\frac{\sqrt{30}}{2}$
C) (h, k) = $(-\frac{3}{2}, 2)$; r= $\frac{3\sqrt{5}}{2}$
D) (h, k) = $(-\frac{3}{2}, 2)$; r = $\frac{\sqrt{30}}{2}$

Answer: B

Find the general form of the equation of the the circle.

148) Center at the point (–4, –3); containing the point (–3, 3)

A) $x^2 + y^2 + 6x - 6y - 17 = 0$
B) $x^2 + y^2 + 8x + 6y - 12 = 0$
C) $x^2 + y^2 + 6x + 8y - 17 = 0$
D) $x^2 + y^2 - 6x + 6y - 12 = 0$

Answer: B

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149) Center at the point (2, –3); containing the point (5, –3)

A) $x^2 + y^2 + 4x - 6y + 22 = 0$ B) $x^2 + y^2 + 4x - 6y + 4 = 0$

C) $x^2 + y^2 - 4x + 6y + 4 = 0$ D) $x^2 + y^2 - 4x + 6y + 22 = 0$

Answer: C

150) Center at the point (4, 6); tangent to y–axis

A) $x^2 + y^2 - 8x - 12y + 68 = 0$ B) $x^2 + y^2 - 8x - 12y + 36 = 0$

C) $x^2 + y^2 + 8x + 12y + 36 = 0$ D) $x^2 + y^2 - 8x - 12y + 16 = 0$

Answer: B

Solve the problem.

151) If a circle of radius 5 is made to roll along the x–axis, what is the equation for the path of the center of the circle?

A) $x = 5$ B) $y = 0$ C) $y = 5$ D) $y = 10$

Answer: C

152) Earth is represented on a map of the solar system so that its surface is a circle with the equation $x^2 + y^2 + 2x + 8y - 3952 = 0$. A weather satellite circles 0.4 units above the Earth with the center of its circular orbit at the center of the Earth. Find the general form of the equation for the orbit of the satellite on this map.

A) $x^2 + y^2 + 2x + 8y - 4002.56 = 0$ B) $x^2 + y^2 - 2x - 8y - 4002.56 = 0$

C) $x^2 + y^2 + 2x + 8y - 45.84 = 0$ D) $x^2 + y^2 + 2x + 8y + 16.84 = 0$

Answer: A

153) Find an equation of the line containing the centers of the two circles

$x^2 + y^2 + 6x + 12y + 44 = 0$ and

$x^2 + y^2 + 10x - 2y + 22 = 0$

A) $7x - 2y - 33 = 0$ B) $-7x - 2y - 33 = 0$ C) $-5x + 8y - 33 = 0$ D) $-7x + 2y - 33 = 0$

Answer: B

154) A wildlife researcher is monitoring a black bear that has a radio telemetry collar with a transmitting range of 26 miles. The researcher is in a research station with her receiver and tracking the bear's movements. If we put the origin of a coordinate system at the research station, what is the equation of all possible locations of the bear where the transmitter would be at its maximum range?

A) $x^2 + y^2 = 26$ B) $x^2 + y^2 = 676$ C) $x^2 - y^2 = 26$ D) $x^2 + y^2 = 52$

Answer: B

155) If a satellite is placed in a circular orbit of 370 kilometers above the Earth, what is the equation of the path of the satellite if the origin is placed at the center of the Earth (the diameter of the Earth is approximately 12,740 kilometers)?

A) $x^2 + y^2 = 171{,}872{,}100$ B) $x^2 + y^2 = 45{,}427{,}600$

C) $x^2 + y^2 = 136{,}900$ D) $x^2 + y^2 = 40{,}576{,}900$

Answer: B

156) A power outage affected all homes and businesses within a 15 mi radius of the power station. If the power station is located 14 mi north of the center of town, find an equation of the circle consisting of the furthest points from the station affected by the power outage.

A) $x^2 + y^2 = 225$ B) $x^2 + (y + 14)^2 = 225$ C) $x^2 + (y - 14)^2 = 15$ D) $x^2 + (y - 14)^2 = 225$

Answer: D

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157) A power outage affected all homes and businesses within a 4 mi radius of the power station. If the power station is located 5 mi west and 6 mi north of the center of town, find an equation of the circle consisting of the furthest points from the station affected by the power outage.

A) $(x - 5)^2 + (y + 6)^2 = 16$

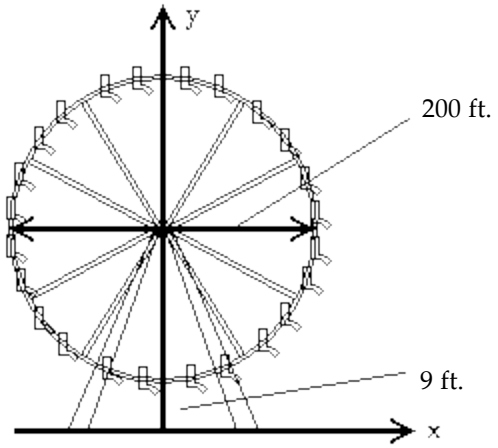
B) $(x + 5)^2 + (y + 6)^2 = 16$

C) $(x + 5)^2 + (y - 6)^2 = 16$

D) $(x - 5)^2 + (y - 6)^2 = 16$

Answer: C

158) A Ferris wheel has a diameter of 200 feet and the bottom of the Ferris wheel is 9 feet above the ground. Find the equation of the wheel if the origin is placed on the ground directly below the center of the wheel, as illustrated.



A) $x^2 + (y - 100)^2 = 10{,}000$

B) $x^2 + y^2 = 10{,}000$

C) $x^2 + (y - 109)^2 = 10{,}000$

D) $x^2 + (y - 100)^2 = 40{,}000$

Answer: C

Determine whether the relation represents a function. If it is a function, state the domain and range.

159)

5	→	30
9	→	54
13	→	78
17	→	102

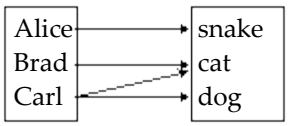
A) function
domain:{30, 54, 78, 102}
range: {5, 9, 13, 17}

B) function
domain: {5, 9, 13, 17}
range: {30, 54, 78, 102}

C) not a function

Answer: B

160)



A) function
domain: {snake, cat, dog}
range: {Alice, Brad, Carl}

B) function
domain: {Alice, Brad, Carl}
range: {snake, cat, dog}

C) not a function

Answer: C

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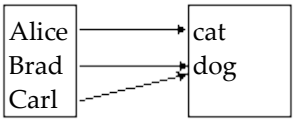
161)



A) function
domain: {Alice, Brad, Carl}
range: {cat, dog}

B) function
domain: {cat, dog}
range: {Alice, Brad, Carl}

C) not a function

Answer: A

162) {(–1, 7), (0, 4), (4, 1), (7, –1)}

A) function
domain: {–1, 0, 4, 7}
range: {7, 4, 1, –1}

B) function
domain: {7, 4, 1, –1}
range: {–1, 0, 4, 7}

C) not a function

Answer: A

163) {(19, –4), (3, –3), (3, 0), (12, 3), (28, 5)}

A) function
domain: {–4, –3, 0, 3, 5}
range: {19, 12, 3, 28}

B) function
domain: {19, 12, 3, 28}
range: {–4, –3, 0, 3, 5}

C) not a function

Answer: C

164) {(–4, 18), (–3, 11), (0, 2), (3, 11), (5, 27)}

A) function
domain: {–4, –3, 0, 3, 5}
range: {18, 11, 2, 27}

B) function
domain: {18, 11, 2, 27}
range: {–4, –3, 0, 3, 5}

C) not a function

Answer: A

165) {(9.55, 12.95), (9.555, –12.9), $(\frac{2}{3}, 0)$, (0.67, –9)}

A) function
domain: {9.55, 9.555, $\frac{2}{3}$, 0.67}
range: {12.95, –12.9, 0, –9}

B) function
domain: {12.95, –12.9, 0, –9}
range: {9.55, 9.555, $\frac{2}{3}$, 0.67}

C) not a function

Answer: A

Determine whether the equation defines y as a function of x.

166) $y = x^3$

A) function

B) not a function

Answer: A

167) $y = \frac{1}{x}$

A) function

B) not a function

Answer: A

168) $y = |x|$

A) function

B) not a function

Answer: A

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169) $y^2 = 7 - x^2$

A) function B) not a function

Answer: B

170) $y = \pm\sqrt{1 - 5x}$

A) function B) not a function

Answer: B

171) $x = y^2$

A) function B) not a function

Answer: B

172) $y^2 + x = 3$

A) function B) not a function

Answer: B

173) $y = 6x^2 - 2x + 7$

A) function B) not a function

Answer: A

174) $y = \dfrac{3x - 1}{x - 3}$

A) function B) not a function

Answer: A

175) $x^2 - 3y^2 = 1$

A) function B) not a function

Answer: B

176) $x - 6y = 2$

A) function B) not a function

Answer: A

177) $-7x + x^2 + 53 = y$

A) function B) not a function

Answer: A

Find the value for the function.

178) Find f(3) when $f(x) = x^2 + 3x - 6$.

A) 24 B) −6 C) 6 D) 12

Answer: D

179) Find f(−1) when $f(x) = \dfrac{x^2 - 7}{x + 3}$.

A) − 3 B) 4 C) 2 D) $\dfrac{1}{2}$

Answer: A

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180) Find f(–9) when f(x) = |x| – 6.

A) –15 B) 3 C) –3 D) 15

Answer: B

181) Find f(5) when f(x) = $\sqrt{x^2 + 3x}$.

A) $2\sqrt{10}$ B) $2\sqrt{7}$ C) $\sqrt{34}$ D) $2\sqrt{3}$

Answer: A

182) Find f(–x) when f(x) = $-2x^2 - 5x + 3$.

A) $-2x^2 + 5x - 3$ B) $2x^2 + 5x - 3$ C) $-2x^2 + 5x + 3$ D) $2x^2 + 5x + 3$

Answer: C

183) Find f(–x) when f(x) = $\frac{x}{x^2 + 5}$.

A) $\frac{-x}{x^2 + 5}$ B) $\frac{x}{-x^2 + 5}$ C) $\frac{-x}{x^2 - 5}$ D) $\frac{-x}{-x^2 + 5}$

Answer: A

184) Find –f(x) when f(x) = $3x^2 - 2x + 3$.

A) $-3x^2 + 2x + 3$ B) $-3x^2 + 2x - 3$ C) $3x^2 + 2x + 3$ D) $3x^2 + 2x - 3$

Answer: B

185) Find –f(x) when f(x) = |x| – 8.

A) –|x| + 8 B) –|x| – 8 C) |–x| + 8 D) |–x| – 8

Answer: A

186) Find f(x – 1) when f(x) = $4x^2 + 4x - 6$.

A) $-4x^2 + 4x - 6$ B) $4x^2 - 4x + 2$ C) $4x^2 - 4x - 6$ D) $4x^2 - 20x + 2$

Answer: C

187) Find f(x + 1) when f(x) = $\frac{x^2 - 2}{x + 3}$.

A) $\frac{x^2 - 1}{x + 4}$ B) $\frac{x^2 + 2x - 1}{x + 4}$ C) $\frac{x^2 + 2x + 3}{x + 4}$ D) $\frac{x^2 + 2x - 1}{x - 2}$

Answer: B

188) Find f(2x) when f(x) = $3x^2 - 2x + 4$.

A) $6x^2 - 4x + 8$ B) $6x^2 - 4x + 4$ C) $12x^2 - 4x + 8$ D) $12x^2 - 4x + 4$

Answer: D

189) Find f(2x) when f(x) = $\sqrt{5x^2 + 7x}$.

A) $\sqrt{10x^2 + 28x}$ B) $\sqrt{20x^2 + 14x}$ C) $2\sqrt{5x^2 + 7x}$ D) $\sqrt{10x^2 + 14x}$

Answer: B

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190) Find f(x + h) when $f(x) = 2x^2 + 5x + 2$.

A) $2x^2 + 2xh + 2h^2 + 5x + 5h + 2$ B) $2x^2 + 2h^2 + 5x + 5h + 2$

C) $2x^2 + 4xh + 2h^2 + 5x + 5h + 2$ D) $2x^2 + 2h^2 + 9x + 9h + 2$

Answer: C

191) Find f(x + h) when $f(x) = \frac{7x + 4}{3x + 5}$.

A) $\frac{7x + 4h}{3x + 5h}$ B) $\frac{7x + 11h}{3x + 8h}$ C) $\frac{7x + 7h + 4}{3x + 3h + 5}$ D) $\frac{7x + 7h + 4}{3x + 5}$

Answer: C

Solve the problem.

192) If $f(x) = 8x^3 + 7x^2 - x + C$ and $f(-3) = 1$, what is the value of C?

A) C = −281 B) C = 151 C) C = −155 D) C = −5

Answer: B

193) If $f(x) = \frac{x - B}{x - A}$, $f(-2) = 0$, and f(4) is undefined, what are the values of A and B?

A) A = −2, B = 4 B) A = −4, B = 2 C) A = 2, B = −4 D) A = 4, B = −2

Answer: D

194) If $f(x) = \frac{x - 5A}{10x + 4}$ and f(10) = −5, what is the value of A?

A) A = 106 B) A = −106 C) A = 102 D) A = −102

Answer: A

195) If a rock falls from a height of 40 meters on Earth, the height H (in meters) after x seconds is approximately $H(x) = 40 - 4.9x^2$.

What is the height of the rock when x = 1.8 seconds? Round to the nearest hundredth, if necessary.

A) 31.18 m B) 24.45 m C) 55.88 m D) 24.12 m

Answer: D

196) If a rock falls from a height of 40 meters on Earth, the height H (in meters) after x seconds is approximately $H(x) = 40 - 4.9x^2$.

When does the rock strike the ground? Round to the nearest hundredth, if necessary.

A) 1.29 sec B) 1.67 sec C) 2.86 sec D) 8.16 sec

Answer: C

197) It has been determined that the number of fish f(t) that can be caught in t minutes in a certain pond using a certain bait is $f(t) = 0.24t + 1$, for $t > 10$. Find the approximate number of fish that can be caught if you fish for 29 minutes.

A) About 7 fish B) About 31 fish C) About 33 fish D) About 17 fish

Answer: A

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198) The function $P(d) = 1 + \frac{d}{33}$ gives the pressure, in atmospheres (atm), at a depth d feet in the sea. Find the pressure at 31 feet.

A) $\frac{32}{33}$ atm B) $\frac{31}{33}$ atm C) $\frac{2}{33}$ atm D) $\frac{64}{33}$ atm

Answer: D

199) The function F described by $F(C) = \frac{9}{5}C + 32$ gives the Fahrenheit temperature corresponding to the Celsius temperature C. Find the Fahrenheit temperature equivalent to 25°C.

A) 122°F B) 167°F C) 212°F D) 77°F

Answer: D

Find the domain of the function.

200) $f(x) = 8x - 2$

A) $\{x \mid x \geq 2\}$ B) $\{x \mid x \neq 0\}$ C) $\{x \mid x > 0\}$ D) all real numbers

Answer: D

201) $f(x) = x^2 + 2$

A) $\{x \mid x > -2\}$ B) $\{x \mid x \geq -2\}$ C) $\{x \mid x \neq -2\}$ D) all real numbers

Answer: D

202) $f(x) = \frac{x^2}{x^2 + 20}$

A) all real numbers B) $\{x \mid x > -20\}$ C) $\{x \mid x \neq 0\}$ D) $\{x \mid x \neq -20\}$

Answer: A

203) $g(x) = \frac{2x}{x^2 - 25}$

A) all real numbers B) $\{x \mid x \neq 0\}$ C) $\{x \mid x > 25\}$ D) $\{x \mid x \neq -5, 5\}$

Answer: D

204) $h(x) = \frac{x - 3}{x^3 - 64x}$

A) all real numbers B) $\{x \mid x \neq 3\}$ C) $\{x \mid x \neq -8, 0, 8\}$ D) $\{x \mid x \neq 0\}$

Answer: C

205) $f(x) = \sqrt{2 - x}$

A) $\{x \mid x \leq 2\}$ B) $\{x \mid x \neq \sqrt{2}\}$ C) $\{x \mid x \neq 2\}$ D) $\{x \mid x \leq \sqrt{2}\}$

Answer: A

206) $\frac{x}{\sqrt{x - 2}}$

A) all real numbers B) $\{x \mid x > 2\}$ C) $\{x \mid x \geq 2\}$ D) $\{x \mid x \neq 2\}$

Answer: B

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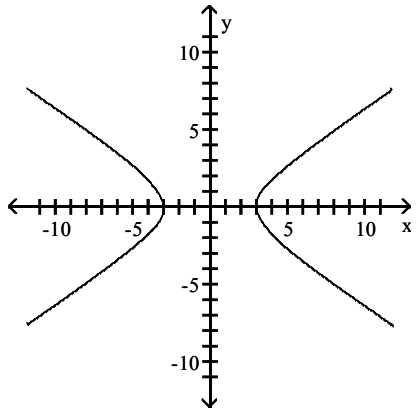
Determine whether the graph is that of a function. If it is, use the graph to find its domain and range, the intercepts, if any, and any symmetry with respect to the x–axis, the y–axis, or the origin.

207)



A) function
domain: {x | –3 ≤ x ≤ 3}
range: all real numbers
intercepts: (–3, 0), (3, 0)
symmetry: x–axis, y–axis

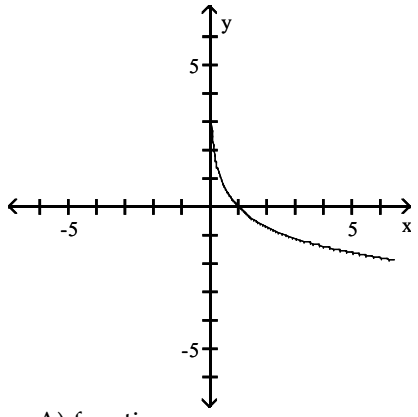
B) function
domain: all real numbers
range: {y | y ≤ –3 or y ≥ 3}
intercepts: (–3, 0), (3, 0)
symmetry: y–axis

C) function
domain: {x | x ≤ –3 or x ≥ 3}
range: all real numbers
intercepts: (–3, 0), (3, 0)
symmetry: x–axis, y–axis, origin

D) not a function

Answer: D

208)



A) function
domain: {x | x > 0}
range: all real numbers
intercept: (0, 1)
symmetry: origin

B) function
domain: {x | x > 0}
range: all real numbers
intercept: (1, 0)
symmetry: none

C) function
domain: all real numbers
range: {y | y > 0}
intercept: (1, 0)
symmetry: none

D) not a function

Answer: B

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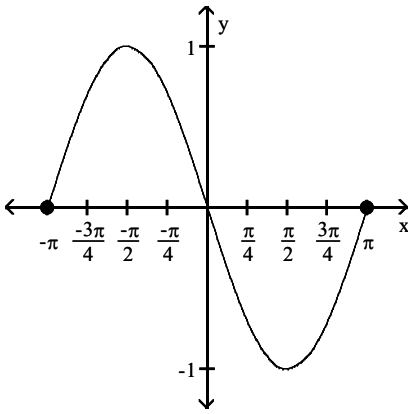
209)



A) function
domain: {x | –1 ≤ x ≤ 1}
range: {y | –π ≤ y ≤ π}
intercepts: (–π, 0), (0, 0), (π, 0)
symmetry: none

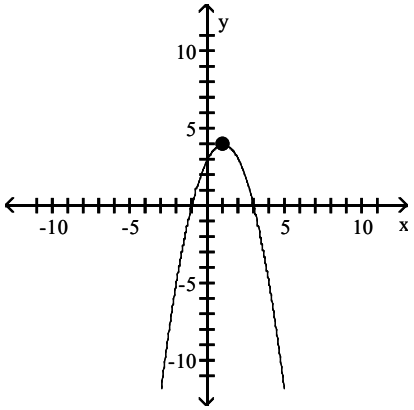
B) function
domain: all real numbers
range: {y | –1 ≤ y ≤ 1}
intercepts: (–π, 0), (0, 0), (π, 0)
symmetry: origin

C) function
domain: {x | –π ≤ x ≤ π}
range: {y | –1 ≤ y ≤ 1}
intercepts: (–π, 0), (0, 0), (π, 0)
symmetry: origin

D) not a function

Answer: C

210)



A) function
domain: all real numbers
range: {y | y ≤ 4}
intercepts: (–1, 0), (0, 3), (3, 0)
symmetry: none

B) function
domain: all real numbers
range: {y | y ≤ 4}
intercepts: (0, –1), (3, 0), (0, 3)
symmetry: none

C) function
domain: {x | x ≤ 4}
range: all real numbers
intercepts: (–1, 0), (0, 3), (3, 0)
symmetry: y–axis

D) not a function

Answer: A

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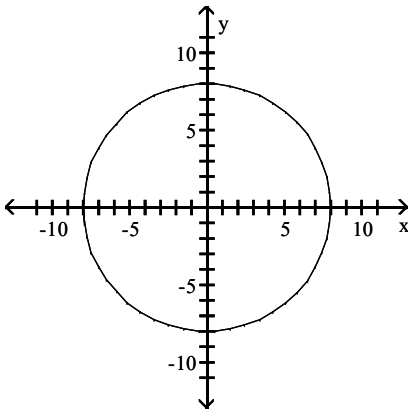
211)



A) function
domain: {x | −8 ≤ x ≤ 8}
range: {y | −8 ≤ y ≤ 8}
intercepts: (−8, 0), (0, −8), (0, 8), (8, 0)
symmetry: x−axis, y−axis, origin

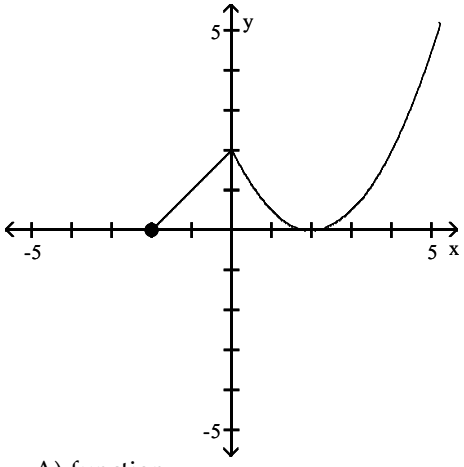
B) function
domain: {x | −8 ≤ x ≤ 8}
range: {y | −8 ≤ y ≤ 8}
intercepts: (−8, 0), (0, −8), (0, 0), (0, 8), (8, 0)
symmetry: origin

C) function
domain: {x | −8 ≤ x ≤ 8}
range: {y | −8 ≤ y ≤ 8}
intercepts: (−8, 0), (0, −8), (0, 8), (8, 0)
symmetry: x−axis, y−axis

D) not a function

Answer: D

212)



A) function
domain: all real numbers
range: all real numbers
intercepts: (−2, 0), (0, 2), (2, 0)
symmetry: none

B) function
domain: {x | x ≥ −2}
range: {y | y ≥ 0}
intercepts: (−2, 0), (0, 2), (2, 0)
symmetry: none

C) function
domain: {x | x ≥ 0}
range: {y | y ≥ −2}
intercepts: (−2, 0), (0, 2), (2, 0)
symmetry: y−axis

D) not a function

Answer: B

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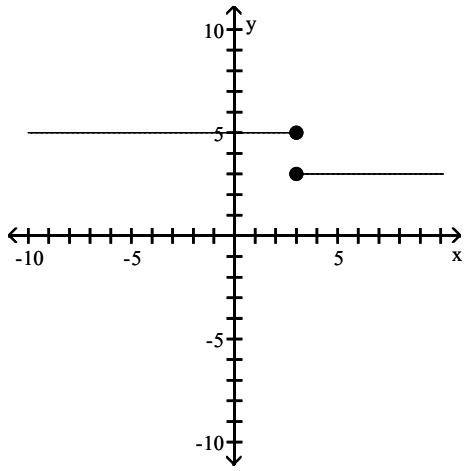
213)



A) function
domain: {x | x = 3 or x = 5}
range: all real numbers
intercept: (5, 0)
symmetry: x–axis

B) function
domain: all real numbers
range: all real numbers
intercept: (0, 5)
symmetry: none

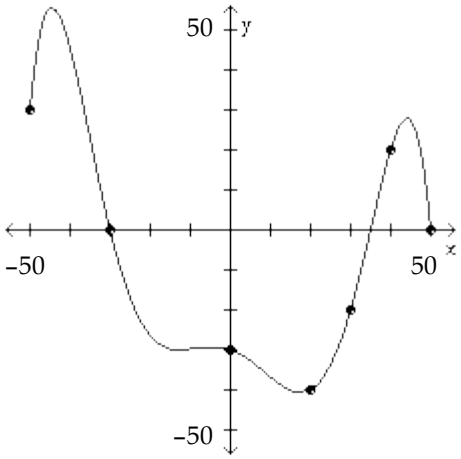
C) function
domain: all real numbers
range: {y | y = 3 or y = 5}
intercept: (0, 5)
symmetry: none

D) not a function

Answer: D

The graph of a function f is given. Use the graph to answer the question.

214) Use the graph of f given below to find f(50).



A) 50 B) 60 C) 100 D) 0

Answer: D

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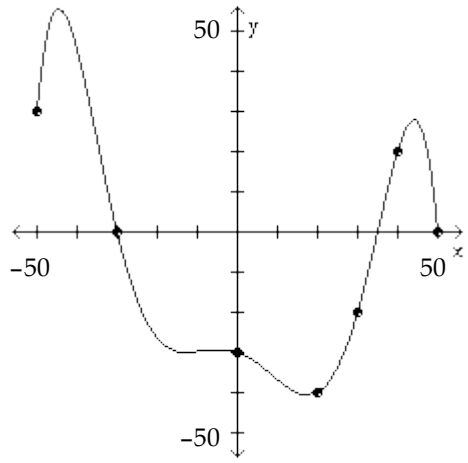
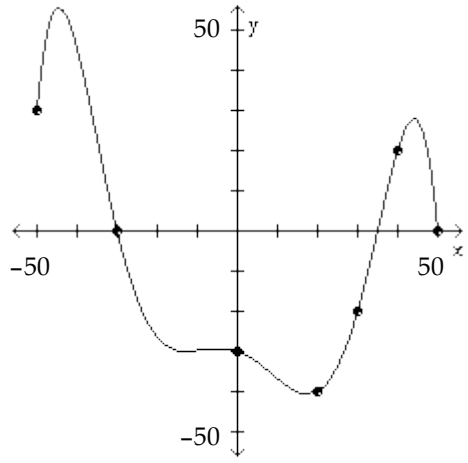
215) Is f(40) positive or negative?



A) positive B) negative

Answer: A

216) Is f(20) positive or negative?



A) positive B) negative

Answer: B

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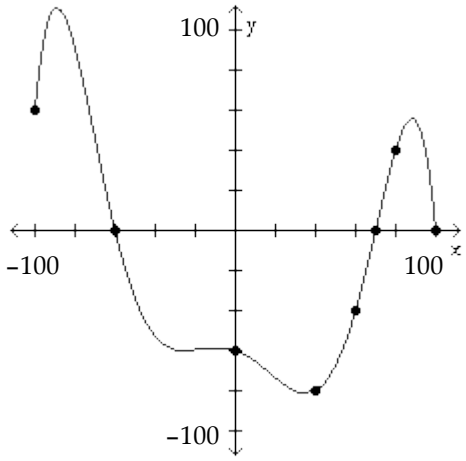
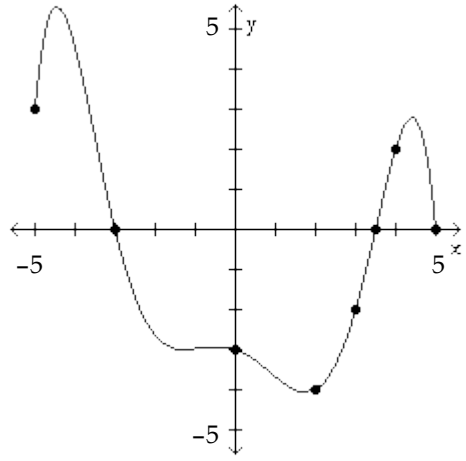
217) For what numbers x is f(x) = 0?



A) (–100, –60), (70, 100)
B) –60
C) (–60, 70)
D) –60, 70, 100

Answer: D

218) For what numbers x is f(x) > 0?



A) (–3, 3.5)
B) [–5, –3), (3.5, 5)
C) (–3, ∞)
D) (–∞ –3)

Answer: B

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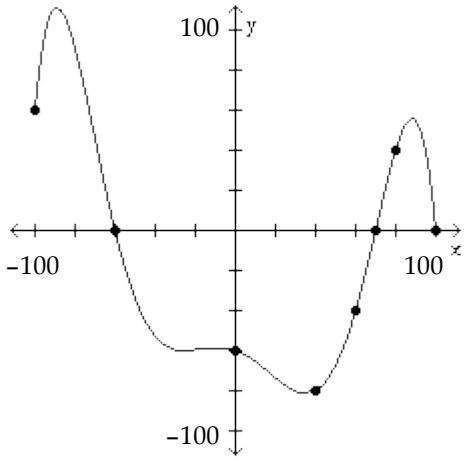
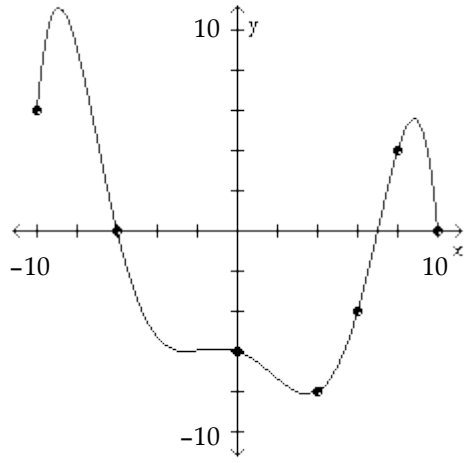
219) For what numbers x is f(x) < 0?



A) (–60, 70)
B) (–∞, –60)
C) (–60, ∞)
D) [–100, –60), (70, 100)

Answer: A

220) What is the domain of f?



A) all real numbers
B) {x | –8 ≤ x ≤ 11}
C) {x | x ≥ 0}
D) {x | –10 ≤ x ≤ 10}

Answer: D

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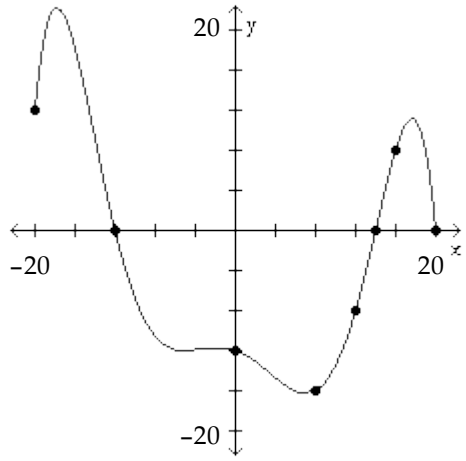
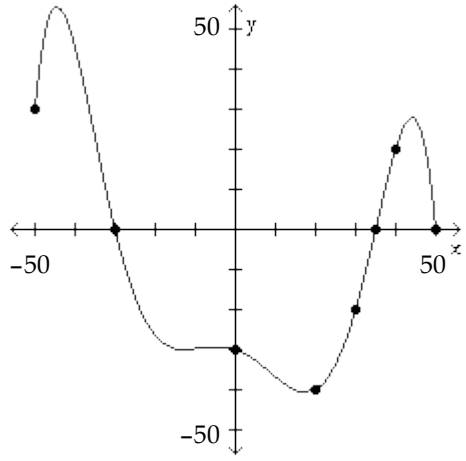
221) What are the x–intercepts?



A) –12, 14 B) –12 C) –12, 14, 20 D) –20, –12, 14, 20

Answer: C

222) What is the y–intercept?



A) –30 B) 50 C) 35 D) –40

Answer: A

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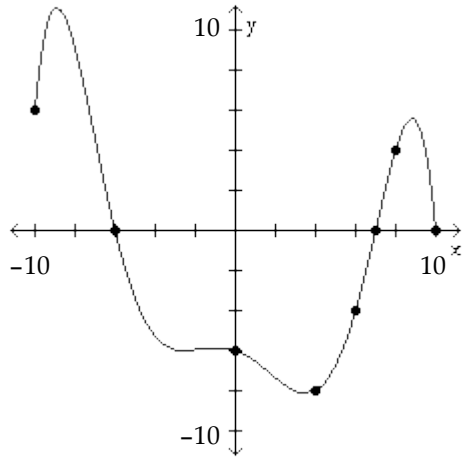
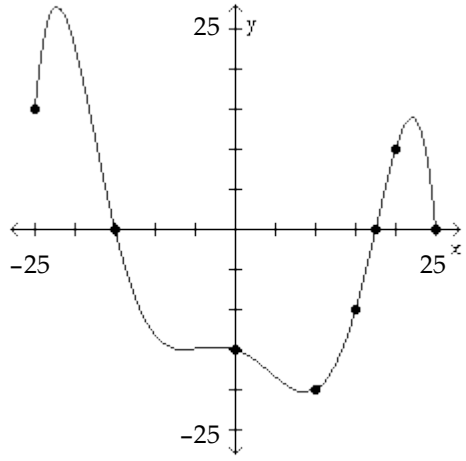
223) How often does the line y = –10 intersect the graph?



A) once B) twice C) three times D) does not intersect

Answer: D

224) How often does the line y = 5 intersect the graph?



A) once B) twice C) three times D) does not intersect

Answer: C

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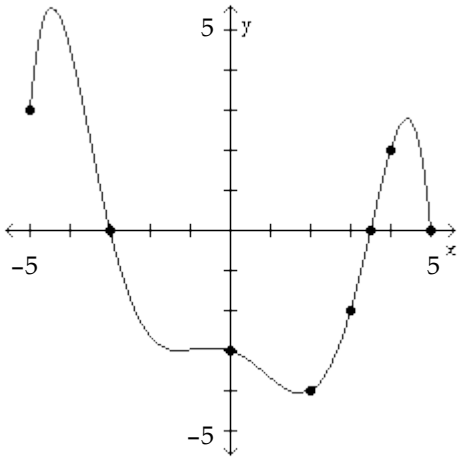
225) For which of the following values of x does f(x) = 2?



A) 5 B) 4 C) 2 D) 7

Answer: B

Answer the question about the given function.

226) Given the function $f(x) = -4x^2 + 8x + 8$, is the point (1, 12) on the graph of f?

A) Yes B) No

Answer: A

227) Given the function $f(x) = -7x^2 - 14x + 7$, is the point (–2, –7) on the graph of f?

A) Yes B) No

Answer: B

228) Given the function $f(x) = -2x^2 - 4x - 1$, if x = –1, what is f(x)? What point is on the graph of f?

A) 1; (–1, 1) B) 1; (1, –1) C) –7; (–1, –7) D) –7; (–7, –1)

Answer: A

229) Given the function $f(x) = 5x^2 + 10x - 6$, what is the domain of f?

A) all real numbers B) $\{x \mid x \geq -1\}$ C) $\{x \mid x \geq 1\}$ D) $\{x \mid x \leq -1\}$

Answer: A

230) Given the function $f(x) = x^2 + 7x - 30$, list the x–intercepts, if any, of the graph of f.

A) (10, 0), (–3, 0) B) (–10, 0), (1, 0) C) (–10, 0), (3, 0) D) (10, 0), (3, 0)

Answer: C

231) Given the function $f(x) = 7x^2 + 14x + 2$, list the y–intercept, if there is one, of the graph of f.

A) 2 B) 16 C) –5 D) 23

Answer: B

232) Given the function $f(x) = \dfrac{x^2 - 2}{x - 3}$, is the point $(-2, -\dfrac{2}{5})$ on the graph of f?

A) Yes B) No

Answer: A

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233) Given the function $f(x) = \frac{x^2 - 6}{x - 1}$, is the point (2, 10) on the graph of f?

A) Yes B) No

Answer: B

234) Given the function $f(x) = \frac{x^2 - 5}{x + 1}$, if x = 2, what is f(x)? What point is on the graph of f?

A) $-\frac{1}{3}; (-\frac{1}{3}, 2)$ B) $-\frac{1}{3}; (2, -\frac{1}{3})$ C) 3; (3, 2) D) 3; (2, 3)

Answer: B

235) Given the function $f(x) = \frac{x^2 + 8}{x - 9}$, what is the domain of f?

A) $\{x | x \neq 9\}$ B) $\{x | x \neq \frac{8}{9}\}$ C) $\{x | x \neq -9\}$ D) $\{x | x \neq 8\}$

Answer: A

236) Given the function $f(x) = \frac{x^2 + 6}{x - 4}$, list the x–intercepts, if any, of the graph of f.

A) $(-\sqrt{6}, 0)$ B) (6, 0), (–6, 0) C) (4, 0) D) none

Answer: D

237) Given the function $f(x) = \frac{x^2 + 3}{x + 9}$, list the y–intercept, if there is one, of the graph of f.

A) $(0, \frac{1}{3})$ B) (0, –3) C) (0, –9) D) $(\frac{1}{3}, 0)$

Answer: A

Solve the problem.

238) If an object weighs m pounds at sea level, then its weight W (in pounds) at a height of h miles above sea level is given approximately by $W(h) = m\left(\frac{4000}{4000 + h}\right)^2$. How much will a man who weighs 165 pounds at sea level weigh on the top of a mountain which is 14,494 feet above sea level? Round to the nearest hundredth of a pound, if necessary.

A) 165.23 pounds B) 164.77 pounds C) 165 pounds D) 7.72 pounds

Answer: B

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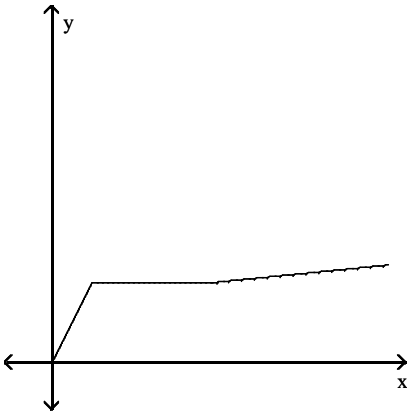
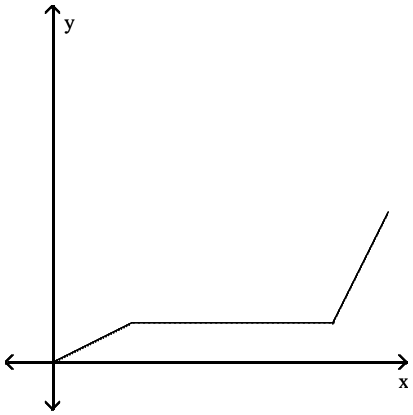
Match the function with the graph that best describes the situation.

239) The amount of rainfall as a function of time, if the rain fell more and more softly.

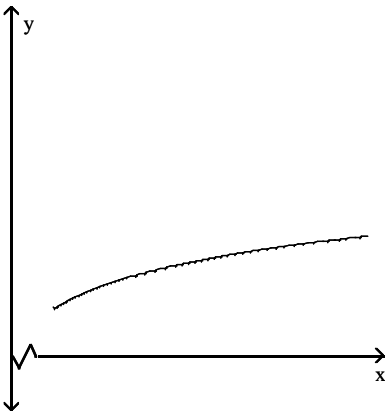
A)



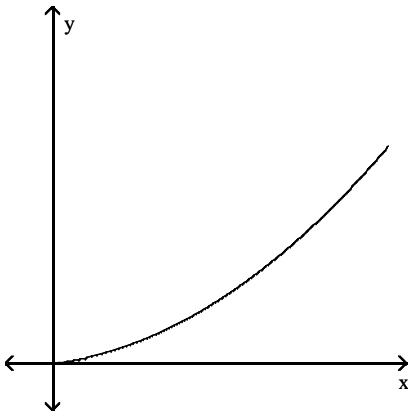
B)



C)



D)



Answer: C

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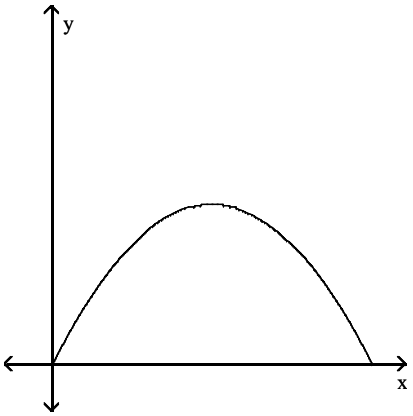
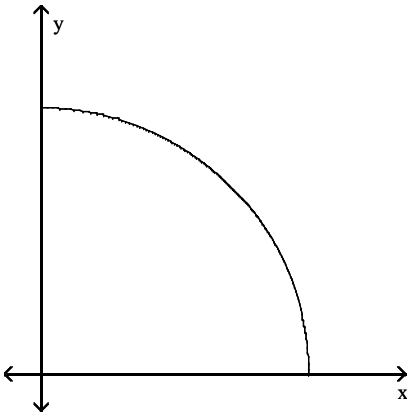
240) The height of an animal as a function of time.

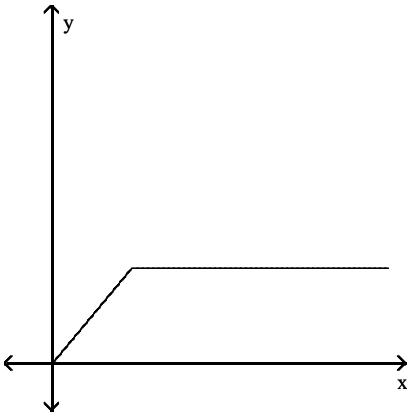
A)



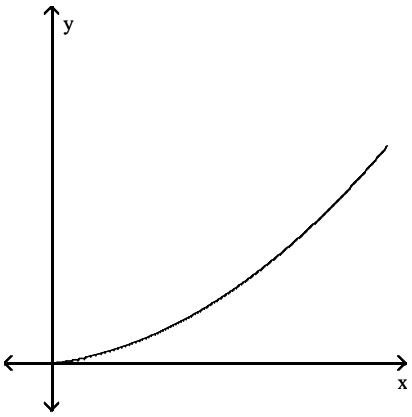
B)



C)



D)



Answer: C

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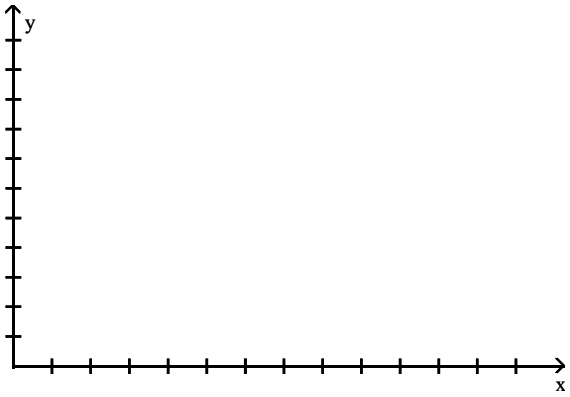
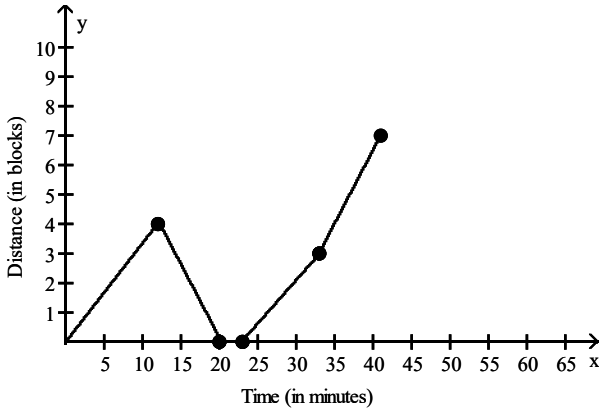
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

241) Michael decides to walk to the mall to do some errands. He leaves home, walks 4 blocks in 12 minutes at a constant speed, and realizes that he forgot his wallet at home. So Michael runs back in 8 minutes. At home, it takes him 3 minutes to find his wallet and close the door. Michael walks 3 blocks in 10 minutes and then decides to jog to the mall. It takes him 8 minutes to get to the mall which is 4 blocks away. Draw a graph of Michael's distance from home (in blocks) as a function of time.



Answer:



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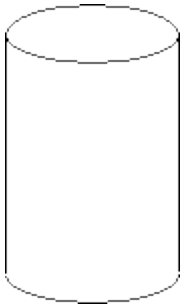
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

242) A steel can in the shape of a right circular cylinder must be designed to hold 400 cubic centimeters of juice (see figure). It can be shown that the total surface area of the can (including the ends) is given by $S(r) = 2\pi r^2 + \frac{800}{r}$, where r is the radius of the can in centimeters. Using the TABLE feature of a graphing utility, find the radius that minimizes the surface area (and thus the cost) of the can. Round to the nearest tenth of a centimeter.



A) 5.2 cm B) 4 cm C) 0 cm D) 3.2 cm

Answer: B

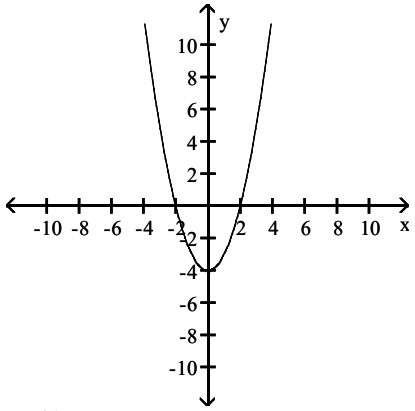
243) The concentration C (arbitrary units) of a certain drug in a patient's bloodstream can be modeled using $C(t) = \frac{t}{(0.506t + 1.975)^2}$, where t is the number of hours since a 500 milligram oral dose was administered. Using the TABLE feature of a graphing utility, find the time at which the concentration of the drug is greatest. Round to the nearest tenth of an hour.

A) 4.7 hours B) 6.2 hours C) 5.4 hours D) 3.9 hours

Answer: D

The graph of a function is given. Decide whether it is even, odd, or neither.

244)



A) even B) odd C) neither

Answer: A

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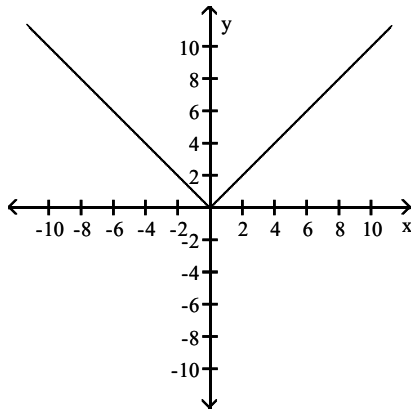
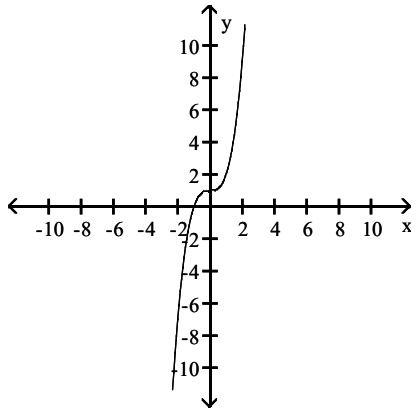
245)



A) even B) odd C) neither

Answer: A

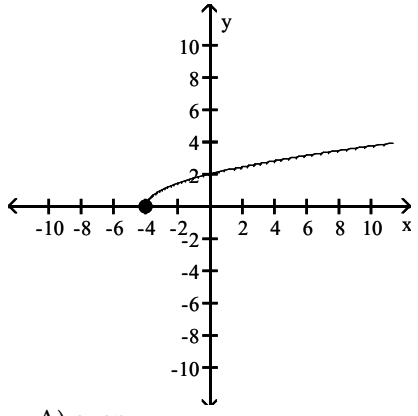
246)



A) even B) odd C) neither

Answer: C

247)



A) even B) odd C) neither

Answer: C

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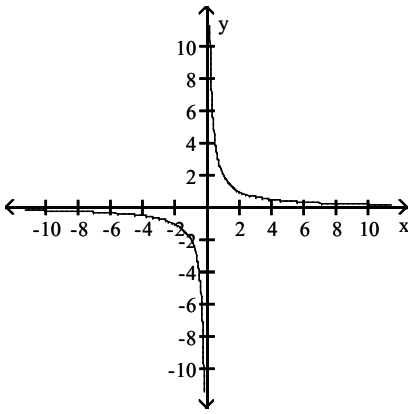
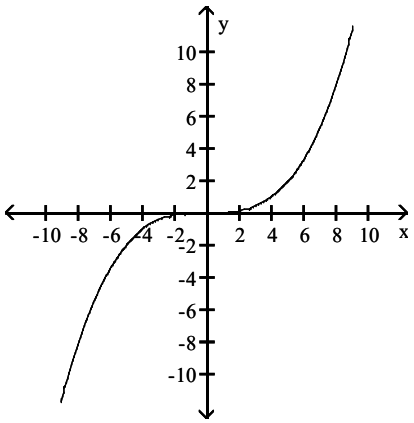
248)



A) even B) odd C) neither

Answer: B

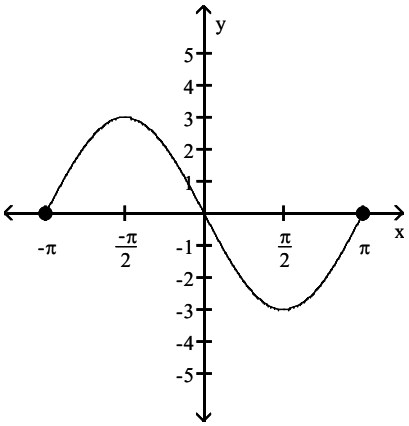
249)



A) even B) odd C) neither

Answer: B

250)



A) even B) odd C) neither

Answer: B

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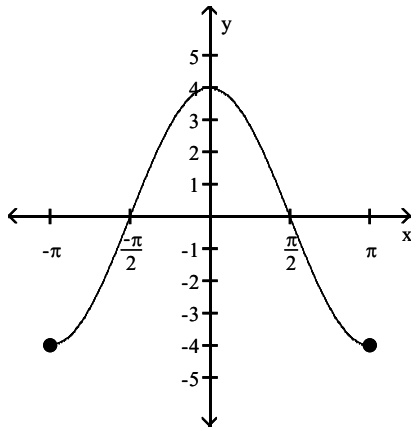
251)



A) even B) odd C) neither

Answer: A

Determine algebraically whether the function is even, odd, or neither.

252) $f(x) = 5x^3$

A) even B) odd C) neither

Answer: B

253) $f(x) = -4x^4 - x^2$

A) even B) odd C) neither

Answer: A

254) $f(x) = -9x^2 - 2$

A) even B) odd C) neither

Answer: A

255) $f(x) = 2x^3 + 4$

A) even B) odd C) neither

Answer: C

256) $f(x) = \sqrt[3]{x}$

A) even B) odd C) neither

Answer: B

257) $f(x) = \sqrt{x}$

A) even B) odd C) neither

Answer: C

258) $\sqrt[3]{7x^2 + 4}$

A) even B) odd C) neither

Answer: A

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259) $f(x) = \dfrac{1}{x^2}$

A) even B) odd C) neither

Answer: A

260) $f(x) = \dfrac{x}{x^2 + 3}$

A) even B) odd C) neither

Answer: B

261) $f(x) = \dfrac{-x^3}{7x^2 - 9}$

A) even B) odd C) neither

Answer: B

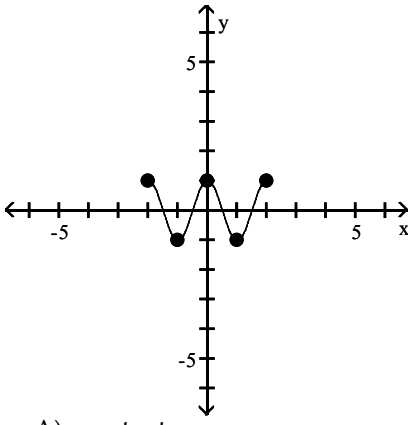
262) $f(x) = \dfrac{-5x}{|x|}$

A) even B) odd C) neither

Answer: B

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

263) (– 2, – 1)



A) constant B) decreasing C) increasing

Answer: B

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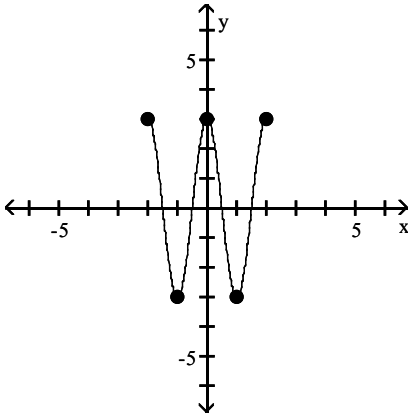
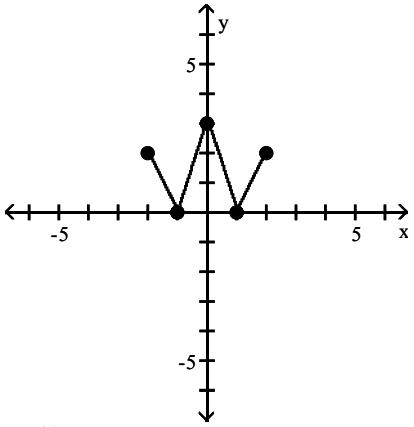
264) (– 1, 0)



A) decreasing B) constant C) increasing

Answer: C

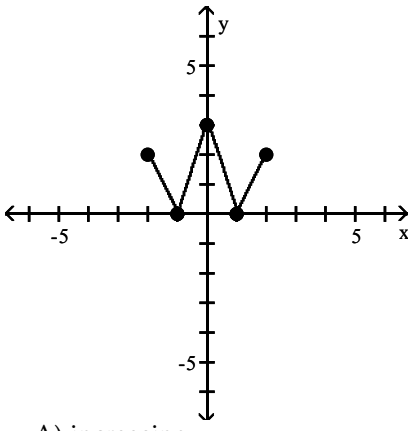
265) (0, 1)



A) constant B) increasing C) decreasing

Answer: C

266) (1, 2)



A) increasing B) constant C) decreasing

Answer: A

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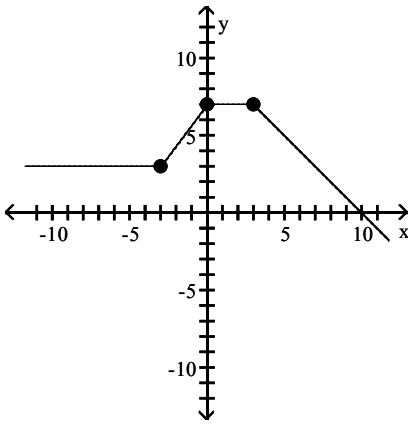
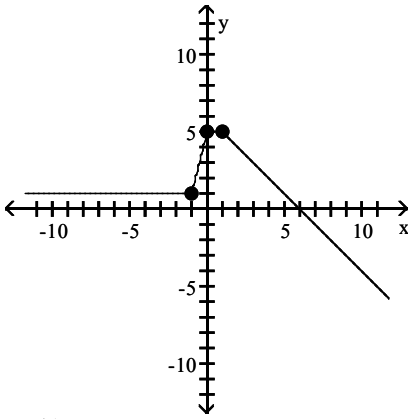
267) (0, 3)



A) decreasing B) constant C) increasing

Answer: B

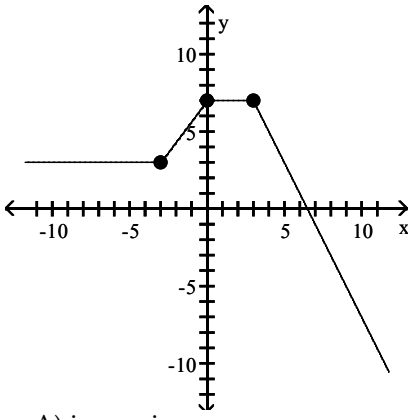
268) (–1, 0)



A) increasing B) constant C) decreasing

Answer: A

269) (3, ∞)



A) increasing B) constant C) decreasing

Answer: C

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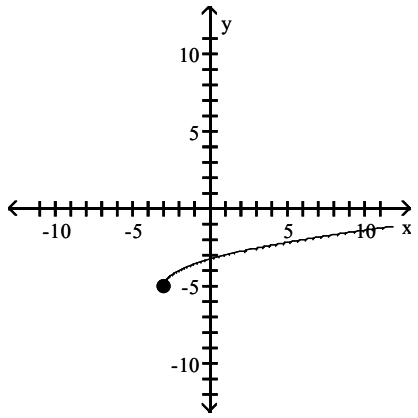
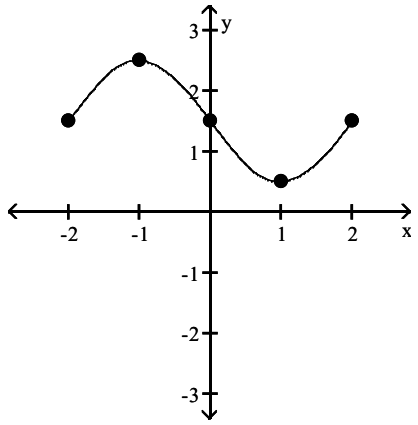
270) (–3, ∞)



A) decreasing B) increasing C) constant

Answer: B

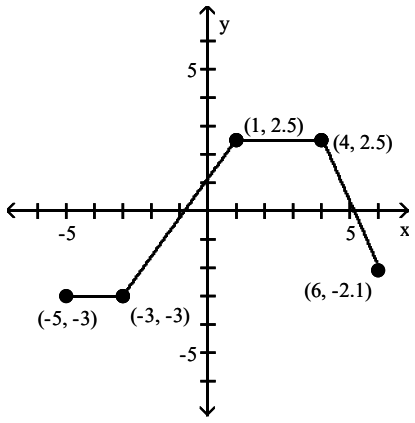
271) (1, 2)



A) decreasing B) constant C) increasing

Answer: C

272) (–5, –3)



A) increasing B) decreasing C) constant

Answer: C

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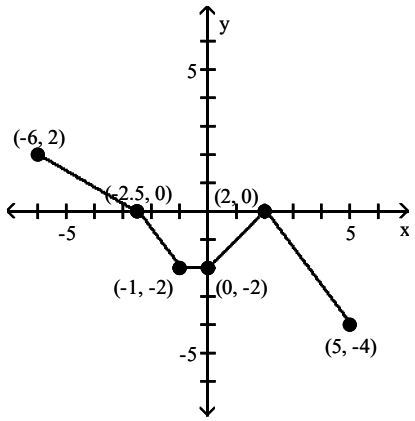
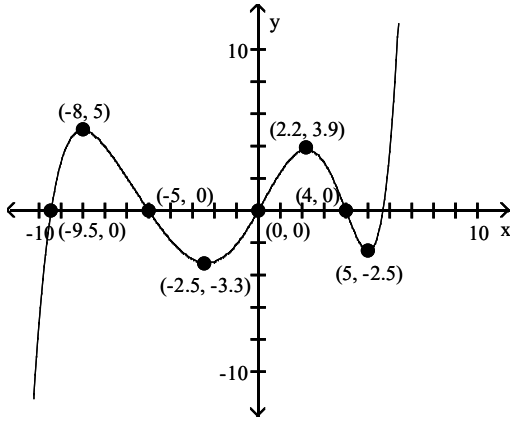
273) (–1, 0)



A) decreasing B) constant C) increasing

Answer: B

274) (5, ∞)



A) increasing B) constant C) decreasing

Answer: A

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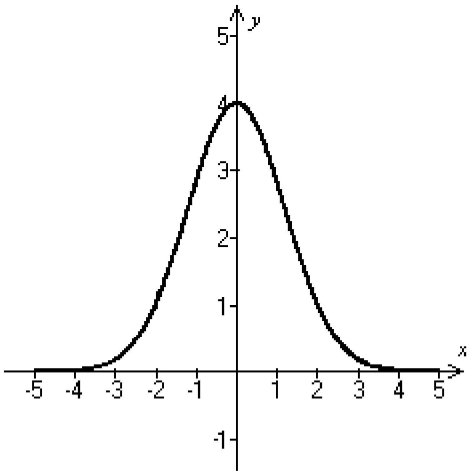
Use the graph to find the intervals on which it is increasing, decreasing, or constant.

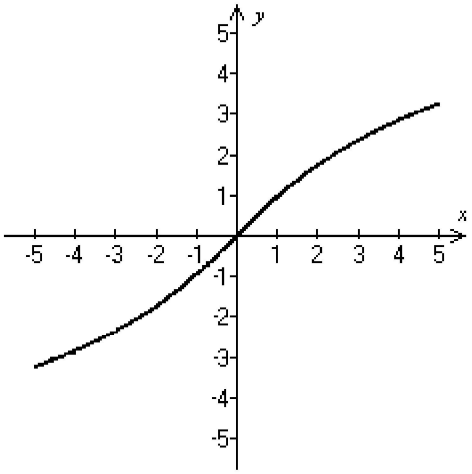
275)



A) Increasing on (−∞, 0); decreasing on (0, ∞)
B) Decreasing on (−∞, ∞)
C) Decreasing on (−∞, 0); increasing on (0, ∞)
D) Increasing on (−∞, ∞)

Answer: A

276)



A) Decreasing on (−∞, ∞)
B) Decreasing on (−∞, 0); increasing on (0, ∞)
C) Increasing on (−∞, 0); decreasing on (0, ∞)
D) Increasing on (−∞, ∞)

Answer: D

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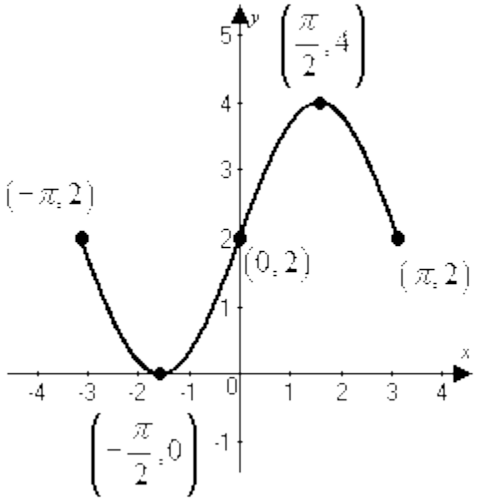
277)



A) Increasing on $(-\infty, \infty)$

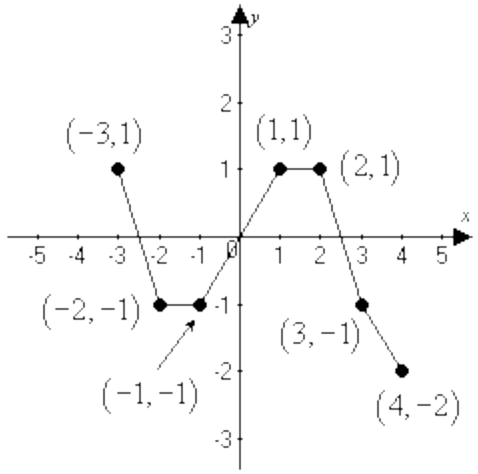
B) Increasing on $\left(-\pi, -\frac{\pi}{2}\right)$ and $\left(\frac{\pi}{2}, \pi\right)$; decreasing on $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

C) Decreasing on $\left(-\pi, -\frac{\pi}{2}\right)$ and $\left(\frac{\pi}{2}, \pi\right)$; increasing on $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

D) Decreasing on $(-\pi, 0)$; increasing on $(0, \pi)$

Answer: C

278)



A) Decreasing on (–3, –2) and (2, 4); increasing on (–1, 1); constant on (–2, –1) and (1, 2)

B) Decreasing on (–3, –1) and (1, 4); increasing on (–2, 1)

C) Decreasing on (–3, –2) and (2, 4); increasing on (–1, 1)

D) Increasing on (–3, –2) and (2, 4); decreasing on (–1, 1); constant on (–2, –1) and (1, 2)

Answer: A

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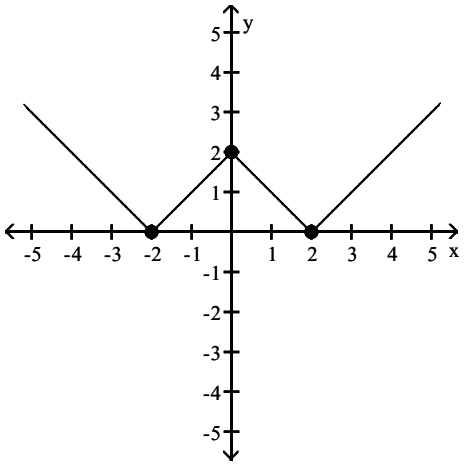
The graph of a function f is given. Use the graph to answer the question.

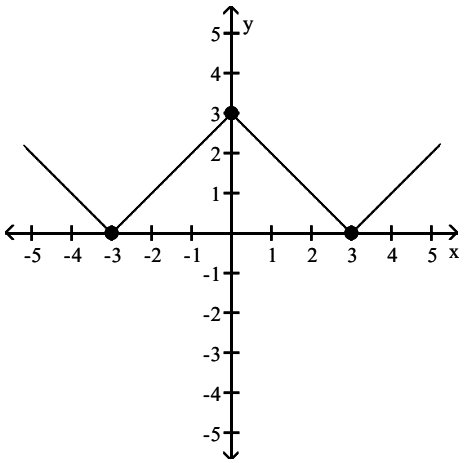
279) Find the numbers, if any, at which f has a local maximum. What are the local maxima?



A) f has a local maximum at x = 0; the local maximum is 2
B) f has a local maximum at x = 2; the local maximum is 2
C) f has a local maximum at x = –2 and 2; the local maximum is 0
D) f has no local maximum

Answer: A

280) Find the numbers, if any, at which f has a local minimum. What are the local minima?



A) f has a local minimum at x = 0; the local minimum is 3
B) f has a local minimum at x = –3 and 3; the local minimum is 0
C) f has a local minimum at x = –3; the local minimum is 0
D) f has no local minimum

Answer: B

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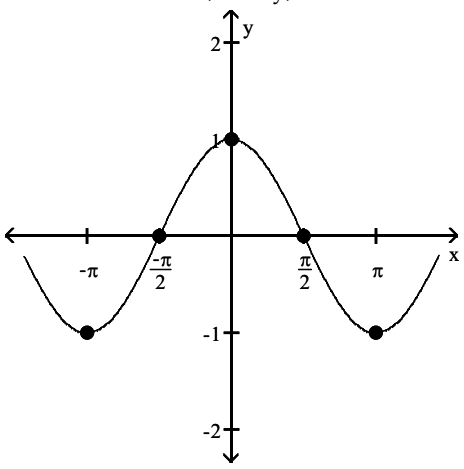
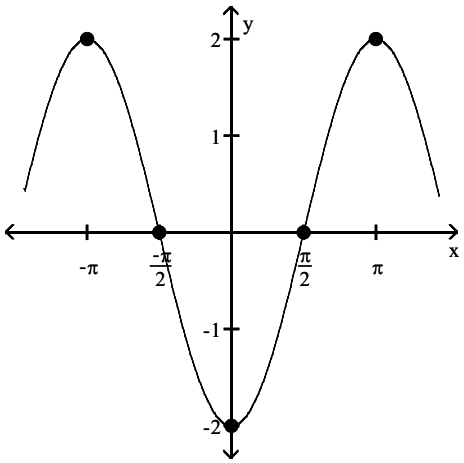
281) Find the numbers, if any, at which f has a local maximum. What are the local maxima?



A) f has a local maximum at $x = -\pi$ and π; the local maximum is –1
B) f has a local maximum at $-\pi$; the local maximum is 1
C) f has a local maximum at $x = 0$; the local maximum is 1
D) f has no local maximum

Answer: C

282) Find the numbers, if any, at which f has a local minimum. What are the local minima?



A) f has no local minimum
B) f has a local minimum at $x = -\pi$; the local minimum is –2
C) f has a local minimum at $x = 0$; the local minimum is –2
D) f has a local minimum at $x = -\pi$ and π; the local minimum is 2

Answer: C

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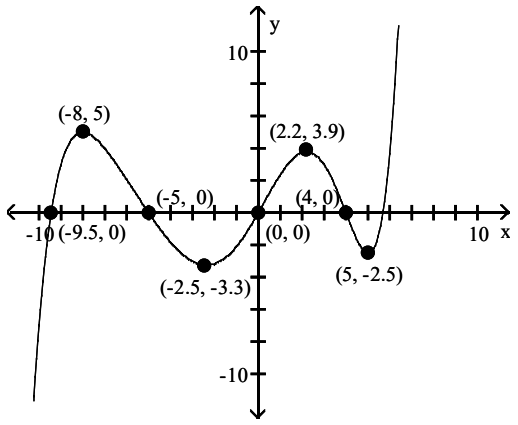
283)



Find the numbers, if any, at which f has a local minimum. What are the local maxima?

A) f has a local maximum at x = –3.3 and –2.5; the local maximum at –3.3 is –2.5; the local maximum at –2.5 is 5

B) f has a local maximum at x = –2.5 and 5; the local maximum at –2.5 is –3.3; the local maximum at 5 is –2.5

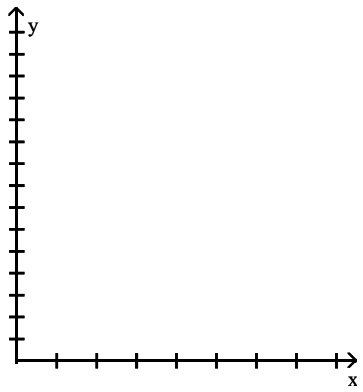
C) f has a local minimum at x = –3.3 and –2.5; the local minimum at –3.3 is –2.5; the local minimum at –2.5 is 5

D) f has a local minimum at x = –2.5 and 5; the local minimum at –2.5 is –3.3; the local minimum at 5 is –2.5

Answer: D

Solve the problem.

284) The height s of a ball (in feet) thrown with an initial velocity of 80 feet per second from an initial height of 8 feet is given as a function of time t (in seconds) by $s(t) = -16t^2 + 80t + 8$. What is the maximum height? Round to the nearest hundredth, if necessary.



A) 100.5 ft B) 108 ft C) 120.5 ft D) –74.5 ft

Answer: B

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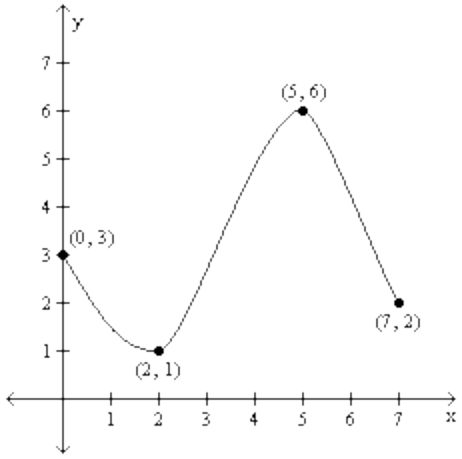
For the graph of the function y = f(x), find the absolute maximum and the absolute minimum, if it exists.

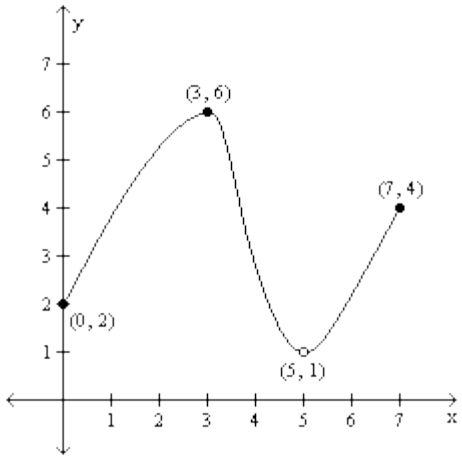
285)



A) Absolute maximum: f(2) = 7; Absolute minimum: f(3) = 0
B) Absolute maximum: f(6) = 5; Absolute minimum: f(1) = 2
C) Absolute maximum: f(7) = 2; Absolute minimum: f(0) = 3
D) Absolute maximum: f(5) = 6; Absolute minimum: f(2) = 1

Answer: D

286)



A) Absolute maximum: f(7) = 4; Absolute minimum: f(0) = 2
B) Absolute maximum: f(3) = 6; Absolute minimum: f(0) = 2
C) Absolute maximum: f(3) = 6; Absolute minimum: f(5) = 1
D) Absolute maximum: f(3) = 6; Absolute minimum: none

Answer: D

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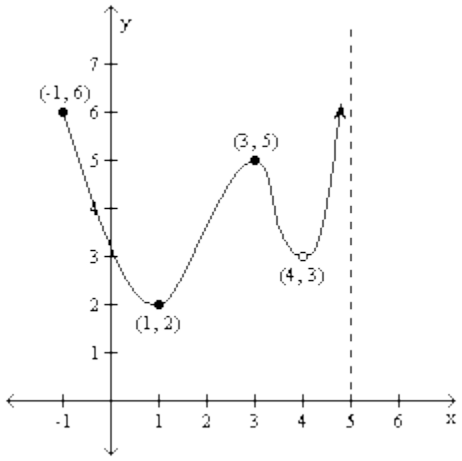
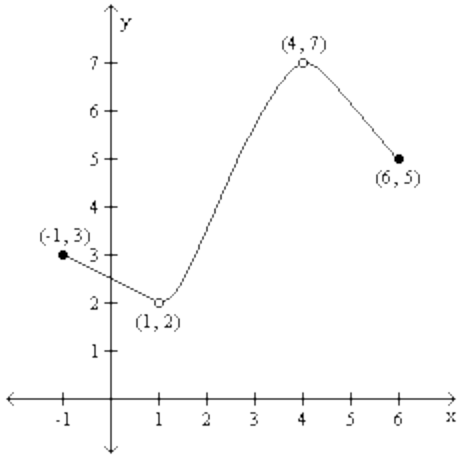
287)



A) Absolute maximum: f(3) = 5; Absolute minimum: f(1) = 2
B) Absolute maximum: none; Absolute minimum: f(1) = 2
C) Absolute maximum: f(−1) = 6; Absolute minimum: f(1) = 2
D) Absolute maximum: none; Absolute minimum: none

Answer: B

288)



A) Absolute maximum: f(4) = 7; Absolute minimum: none
B) Absolute maximum: f(4) = 7; Absolute minimum: f(1) = 2
C) Absolute maximum: none; Absolute minimum: f(1) = 2
D) Absolute maximum: none; Absolute minimum: none

Answer: D

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Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. Determine where the function is increasing and where it is decreasing. If necessary, round answers to two decimal places.

289) $f(x) = x^3 - 3x + 1, (-2, 2)$

A) local maximum at (–1, 3)
local minimum at (1, –1)
increasing on (–1, 1)
decreasing on (–2, –1) and (1, 2)

B) local maximum at (1, –1)
local minimum at (–1, 3)
increasing on (–2, –1) and (1, 2)
decreasing on (–1, 1)

C) local maximum at (1, –1)
local minimum at (–1, 3)
increasing on (–2, –1)
decreasing on (–1, 1)

D) local maximum at (–1, 3)
local minimum at (1, –1)
increasing on (–2, –1) and (1, 2)
decreasing on (–1, 1)

Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

290) $f(x) = x^3 - 4x^2 + 6;\ (-1, 4)$

Answer: local maximum at (0, 6)
local minimum at (2.67, –3.48)
increasing on (–1, 0) and (2.67, 4)
decreasing on (0, 2.67)

291) $f(x) = x^5 - x^2;\ (-2, 2)$

Answer: local maximum at (0, 0)
local minimum at (0.74, –0.33)
increasing on (–2, 0) and (0.74, 2)
decreasing on (0, 0.74)

292) $f(x) = -0.3x^3 + 0.2x^2 + 4x - 5;\ (-4, 5)$

Answer: local maximum at (2.34, 1.61)
local minimum at (–1.9, –9.82)
increasing on (–1.9, 2.34)
decreasing on (–4, –1.9) and (2.34, 5)

293) $f(x) = 0.15x^4 + 0.3x^3 - 0.8x^2 + 5;\ (-4, 2)$

Answer: local maximum at (0, 5)
local minima at (–2.55, 1.17) and (1.05, 4.65)
increasing on (–2.55, 0) and (1.05, 2)
decreasing on (–4, –2.55) and (0, 1.05)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. If necessary, round answers to two decimal places.

294) $f(x) = x^2 + 2x - 3;\ (-5, 5)$

A) local maximum at (1, –4)
B) local minimum at (–1, –4)
C) local maximum at (–1, 4)
D) local minimum at (1, 4)

Answer: B

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295) $f(x) = 2 + 8x - x^2;\ (-5, 5)$

A) local minimum at (–4, 18)
B) local maximum at (4, 18)
C) local minimum at (4, 50)
D) local maximum at (–4, 50)

Answer: B

296) $f(x) = x^3 - 3x^2 + 1;\ (-5, 5)$

A) local minimum at (0, 1)
local maximum at (2, –3)
B) local minimum at (2, –3)
C) local maximum at (0, 1)
local minimum at (2, –3)
D) none

Answer: C

297) $f(x) = x^3 - 12x + 2;\ (-5, 5)$

A) local maximum at (–2, 18)
local minimum at (0, 0)
local minimum at (2, –14)
B) local minimum at (0, 0)
C) local maximum at (–2, 18)
local minimum at (2, –14)
D) none

Answer: C

298) $f(x) = x^4 - 5x^3 + 3x^2 + 9x - 3;\ (-5, 5)$

A) local minimum at (–0.61, –5.64)
local maximum at (1.41, 6.12)
local minimum at (3, –3)
B) local minimum at (–1, –6)
local maximum at (1, 6)
local minimum at (3, –3)
C) local minimum at (–0.57, –6.12)
local maximum at (1.32, 5.64)
local minimum at (3, –3)
D) local minimum at (–3, –3)
local maximum at (–1.32, 5.64)
local minimum at (0.57, –6.12)

Answer: C

Solve.

299) John owns a hotdog stand. He has found that his profit is represented by the equation $P(x) = -x^2 + 60x + 79$, with P being profits and x the number of hotdogs sold. How many hotdogs must he sell to earn the most profit?

A) 49 hotdogs
B) 31 hotdogs
C) 30 hotdogs
D) 24 hotdogs

Answer: C

300) Bob owns a watch repair shop. He has found that the cost of operating his shop is given by $c(x) = 4x^2 - 312x + 55$, where c is cost and x is the number of watches repaired. How many watches must he repair to have the lowest cost?

A) 55 watches
B) 39 watches
C) 27 watches
D) 40 watches

Answer: B

301) John owns a hotdog stand. His profit is represented by the equation $P(x) = -x^2 + 14x + 59$, with P being profits and x the number of hotdogs sold. What is the most he can earn?

A) $150
B) $108
C) $87
D) $49

Answer: B

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302) A rock falls from a tower that is 142.1 m high. As it is falling, its height is given by the formula $h(t) = 142.1 - 4.9t^2$. How many seconds will it take for the rock to hit the ground (h=0)? Round to the nearest tenth.

A) 4100 sec B) 29.2 sec C) 5.4 sec D) 11.9 sec

Answer: C

303) A projectile is thrown upward so that its distance above the ground after t seconds is $h(t) = -16t^2 + 240t$. After how many seconds does it reach its maximum height? Round to the nearest second.

A) 6 sec B) 8 sec C) 24 sec D) 18 sec

Answer: B

304) A rock falls from a tower that is 464 ft high. As it is falling, its height is given by the formula $h(t) = 464 - 16t^2$. How many seconds will it take for the rock to hit the ground (h=0)? Round to the nearest tenth.

A) 13,456 sec B) 29.2 sec C) 5.4 sec D) 21.5 sec

Answer: C

For the function, find the average rate of change of f from 1 to x:

$\frac{f(x) - f(1)}{x - 1}$, $x \neq 1$

305) $f(x) = 3x$

A) $\frac{3}{x - 1}$ B) 3 C) 0 D) 2

Answer: B

306) $f(x) = x^2 - 2x$

A) $x - 1$ B) $\frac{x^2 - 2x - 1}{x - 1}$ C) 1 D) $x + 1$

Answer: A

307) $f(x) = \frac{8}{x + 7}$

A) $\frac{8}{x(x + 7)}$ B) $-\frac{1}{x + 7}$ C) $\frac{1}{x + 7}$ D) $\frac{8}{(x - 1)(x + 7)}$

Answer: B

308) $f(x) = \sqrt{x + 35}$

A) $\frac{\sqrt{x + 35} + 6}{x - 1}$ B) $\frac{\sqrt{x + 35} - 6}{x + 1}$ C) $\frac{\sqrt{x + 35} + 6}{x + 1}$ D) $\frac{\sqrt{x + 35} - 6}{x - 1}$

Answer: D

Find the average rate of change for the function between the given values.

309) $f(x) = -3x + 6$; from 1 to 2

A) 6 B) –6 C) –3 D) 3

Answer: C

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310) $f(x) = x^2 + 5x$; from 1 to 4

A) 9 B) 12 C) 10 D) $\frac{15}{2}$

Answer: C

311) $f(x) = 2x^3 + 7x^2 - 3$; from 5 to 7

A) 513 B) $\frac{604}{7}$ C) $\frac{1026}{7}$ D) 302

Answer: D

312) $f(x) = \sqrt{2x}$; from 2 to 8

A) $-\frac{3}{10}$ B) 2 C) 7 D) $\frac{1}{3}$

Answer: D

313) $f(x) = \frac{3}{x-2}$; from 4 to 7

A) $\frac{1}{3}$ B) 2 C) 7 D) $-\frac{3}{10}$

Answer: D

314) $f(x) = 4x^2$; from 0 to $\frac{7}{4}$

A) $\frac{1}{3}$ B) 7 C) 2 D) $-\frac{3}{10}$

Answer: B

315) $f(x) = -3x^2 - x$; from 5 to 6

A) −34 B) $\frac{1}{2}$ C) −2 D) $-\frac{1}{6}$

Answer: A

316) $f(x) = x^3 + x^2 - 8x - 7$; from 0 to 2

A) −28 B) −2 C) $\frac{1}{2}$ D) $-\frac{1}{6}$

Answer: B

317) $f(x) = \sqrt{2x-1}$; from 1 to 5

A) −28 B) $-\frac{1}{6}$ C) −2 D) $\frac{1}{2}$

Answer: D

318) $f(x) = \frac{3}{x+2}$; from 1 to 4

A) $-\frac{1}{6}$ B) $\frac{1}{2}$ C) −2 D) −28

Answer: A

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Find an equation of the secant line containing (1, f(1)) and (2, f(2)).

319) $f(x) = x^3 + x$

A) $y = -8x + 6$ B) $y = 8x + 6$ C) $y = -8x - 6$ D) $y = 8x - 6$

Answer: D

320) $f(x) = \frac{3}{x + 2}$

A) $y = -\frac{1}{4}x + \frac{5}{4}$ B) $y = \frac{3}{4}x + \frac{1}{4}$ C) $y = \frac{1}{4}x + \frac{5}{3}$ D) $y = \frac{1}{4}x + \frac{3}{4}$

Answer: A

321) $f(x) = \sqrt{x + 48}$

A) $y = (5\sqrt{2} - 7)x - 5\sqrt{2} + 14$ B) $y = (-5\sqrt{2} - 7)x - 5\sqrt{2} + 14$

C) $y = (5\sqrt{2} - 7)x + 5\sqrt{2} - 14$ D) $y = (-5\sqrt{2} + 7)x + 5\sqrt{2} - 14$

Answer: A

Solve the problem.

322) From April through December 2000, the stock price of QRS Company had a roller coaster ride. The chart below indicates the price of the stock at the beginning of each month during that period. Find the monthly average rate of change in price between June and September.

Month	Price
April (x = 1)	114
May	108
June	88
July	99
August	94
September	111
October	91
November	85
December	64

A) \$11.50 per month B) –\$11.50 per month C) \$7.67 per month D) –\$7.67 per month

Answer: C

323) Along with incomes, people's charitable contributions have steadily increased over the past few years. The table below shows the average deduction for charitable contributions reported on individual income tax returns for the period 1993 to 1998. Find the average rate of change between 1995 and 1997.

Year	Charitable Contributions
1993	\$1660
1994	\$2350
1995	\$2450
1996	\$2800
1997	\$3040
1998	\$3150

A) \$350 per year B) \$295 per year C) \$590 per year D) \$345 per year

Answer: B

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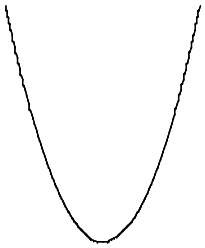
324) A deep sea diving bell is being lowered at a constant rate. After 12 minutes, the bell is at a depth of 400 ft. After 40 minutes the bell is at a depth of 1500 ft. What is the average rate of lowering per minute? Round to the nearest hundredth is needed.

A) 37.5 ft per minute B) 39.3 ft per minute C) 0.03 ft per minute D) 27.5 ft per minute

Answer: B

Match the graph to the function listed whose graph most resembles the one given.

325)



A) cube function
B) absolute value function
C) square function
D) reciprocal function

Answer: C

326)

A) reciprocal function
B) linear function
C) absolute value function
D) constant function

Answer: D

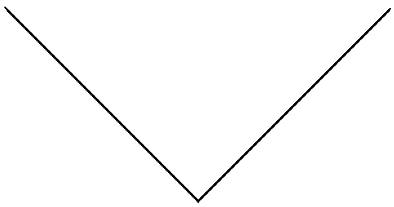
327)



A) square function
B) cube function
C) cube root function
D) square root function

Answer: D

328)



A) reciprocal function
B) linear function
C) absolute value function
D) square function

Answer: C

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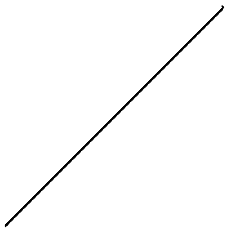
329)



A) constant function
B) reciprocal function
C) linear function
D) absolute value function

Answer: C

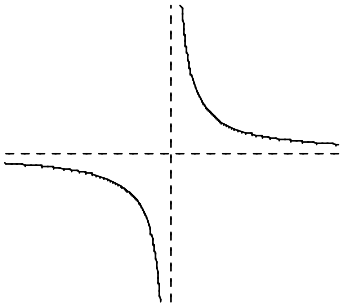
330)



A) cube function
B) square root function
C) cube root function
D) square function

Answer: A

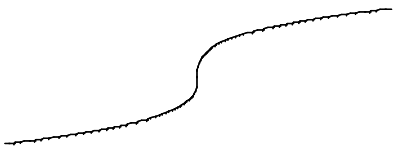
331)



A) square root function
B) reciprocal function
C) absolute value function
D) square function

Answer: B

332)



A) square function
B) cube root function
C) square root function
D) cube function

Answer: B

Graph the function.

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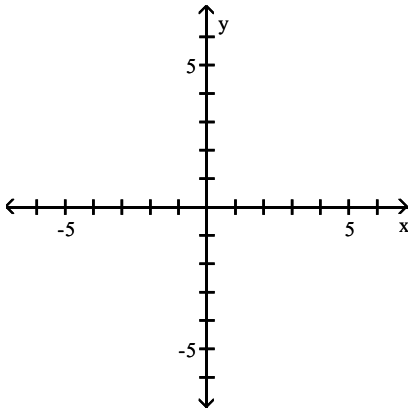
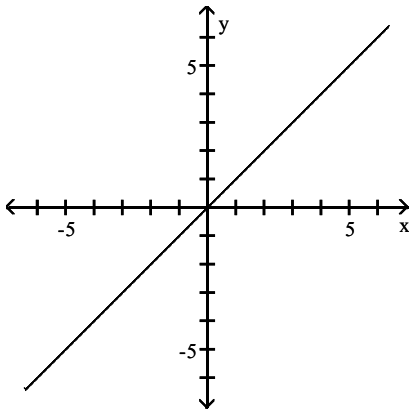
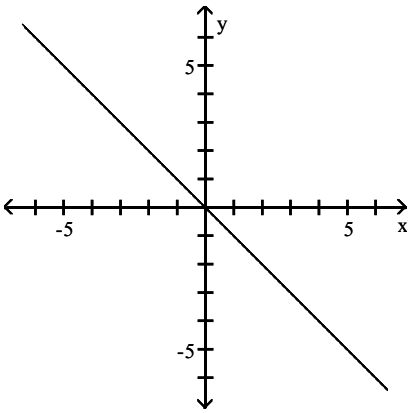
333) f(x) = x



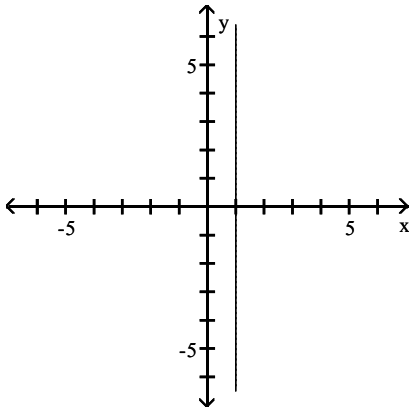
A)



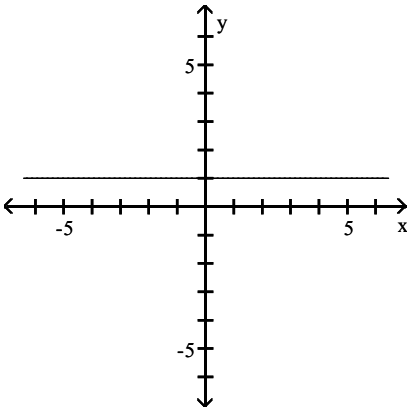
B)



C)



D)



Answer: A

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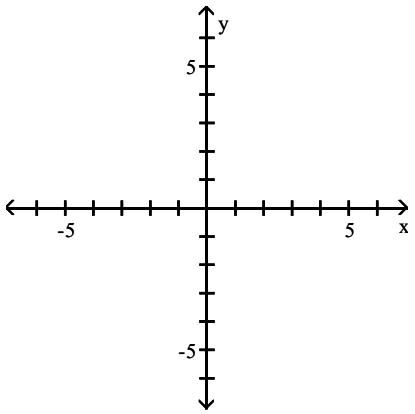
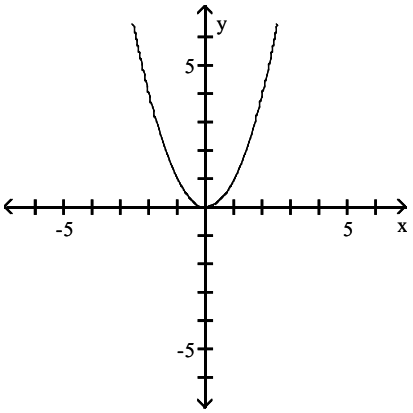
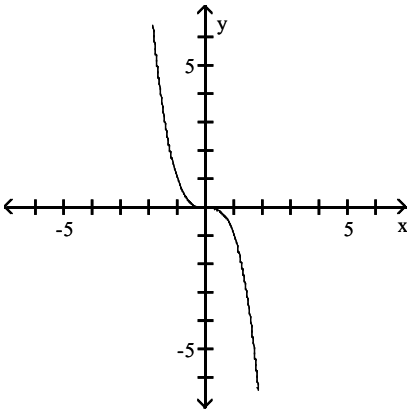
334) $f(x) = x^2$



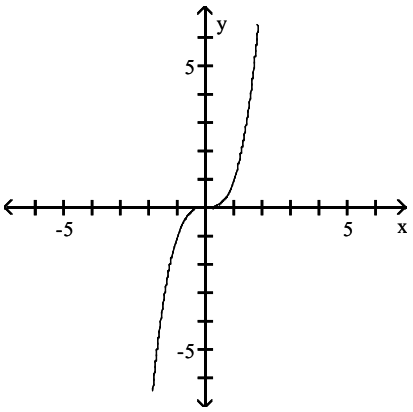
A)



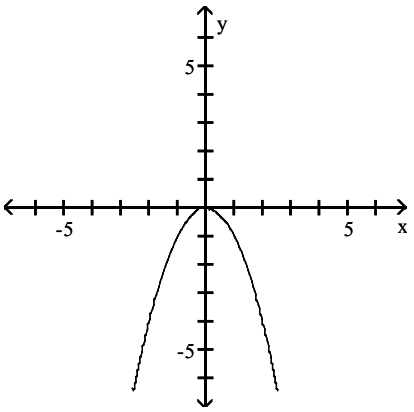
B)



C)



D)



Answer: A

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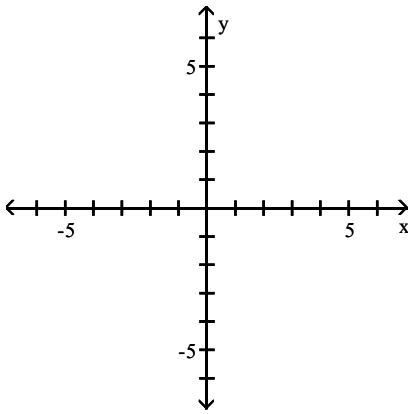
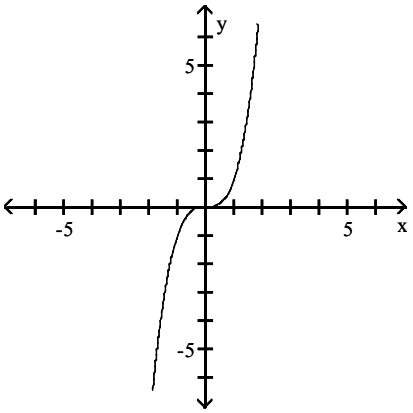
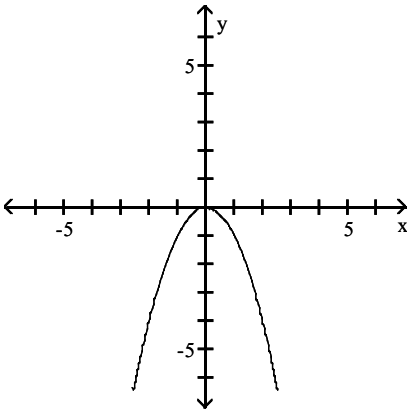
335) $f(x) = x^3$



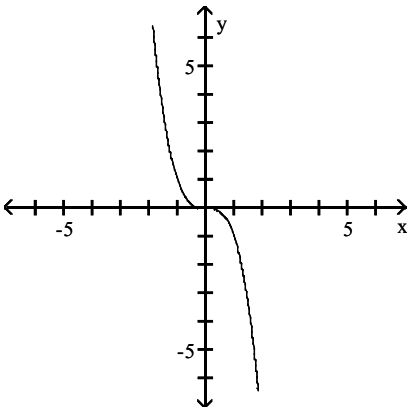
A)



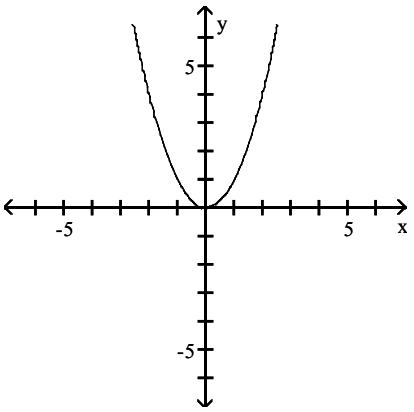
B)



C)



D)



Answer: A

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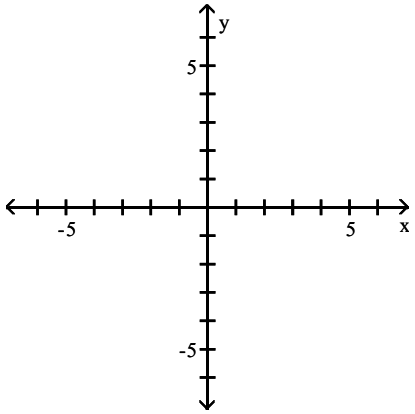
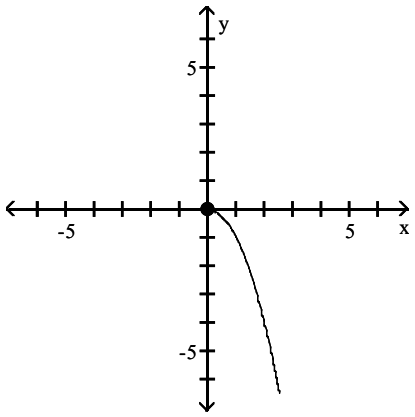
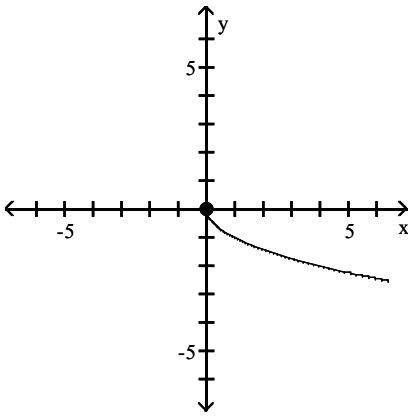
336) $f(x) = \sqrt{x}$



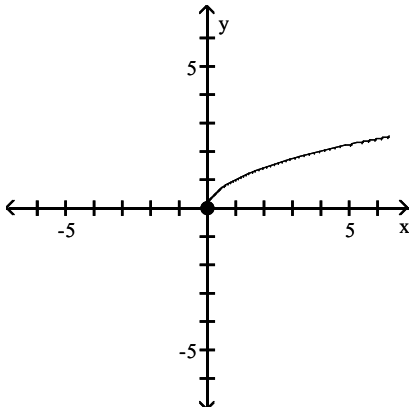
A)



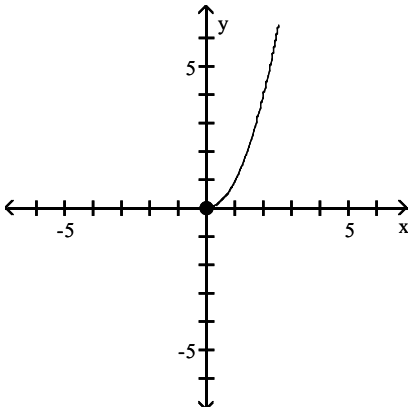
B)



C)



D)



Answer: C

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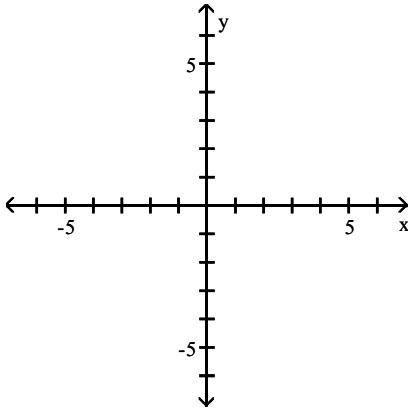
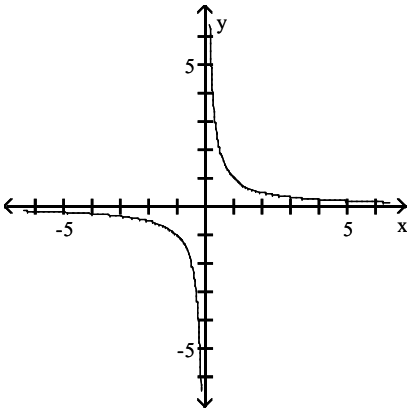
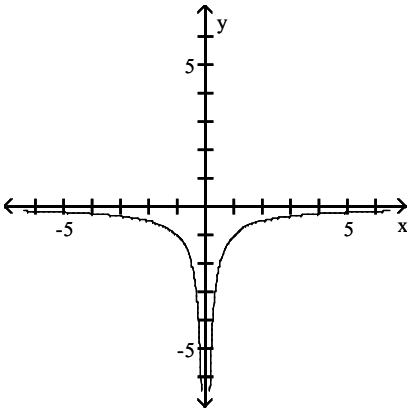
337) $f(x) = \frac{1}{x}$



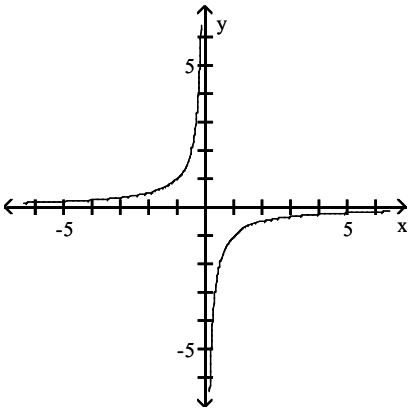
A)



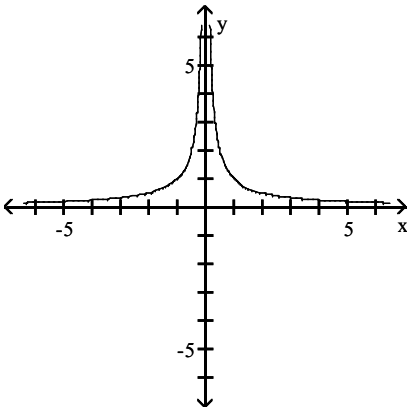
B)



C)



D)



Answer: A

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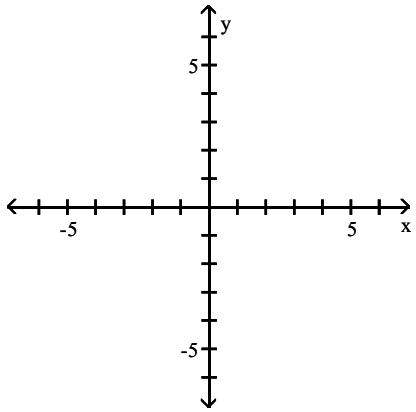
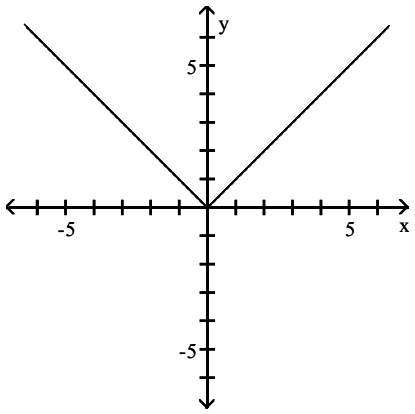
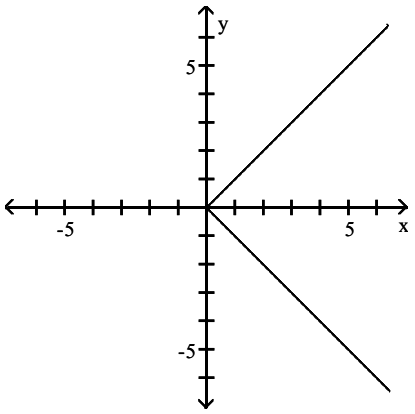
338) $f(x) = |x|$



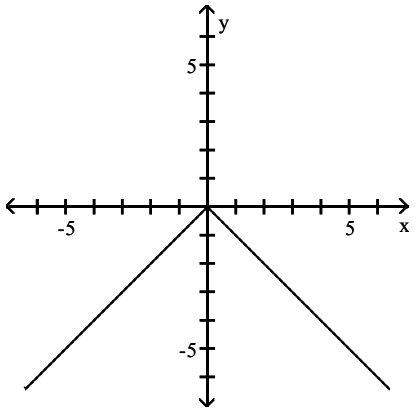
A)



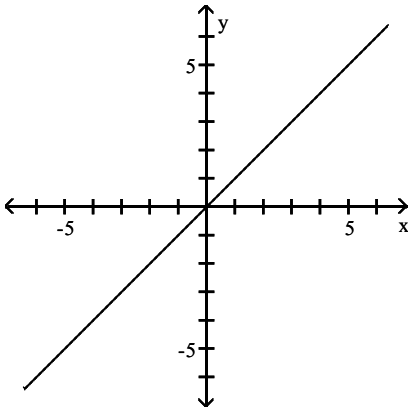
B)



C)



D)



Answer: A

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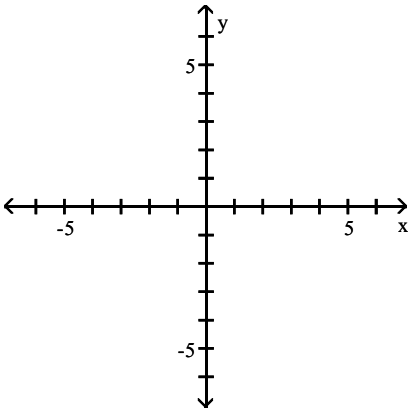
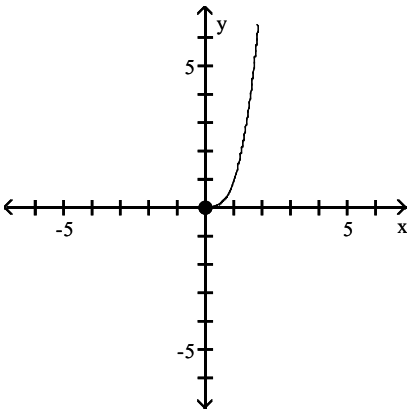
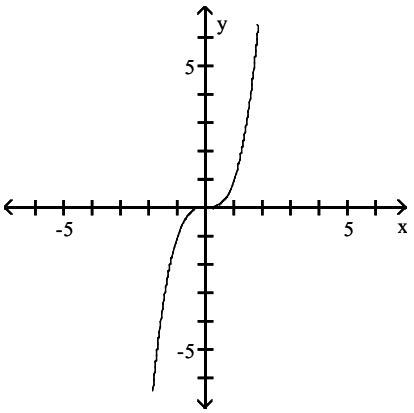
339) $f(x) = \sqrt[3]{x}$



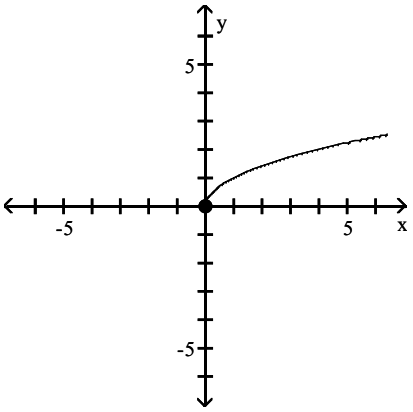
A)



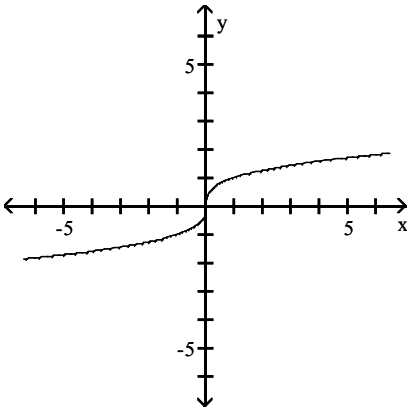
B)



C)



D)



Answer: D

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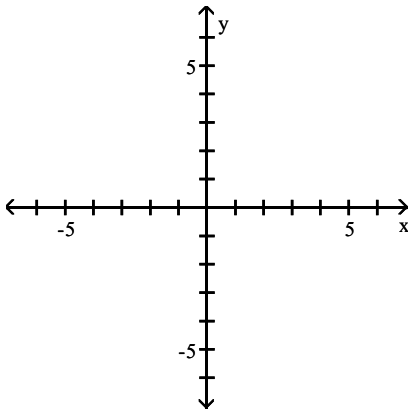
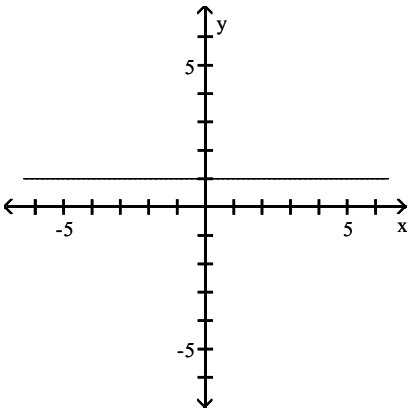
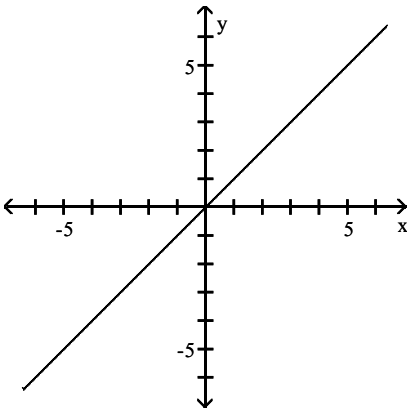
340) f(x) = 1



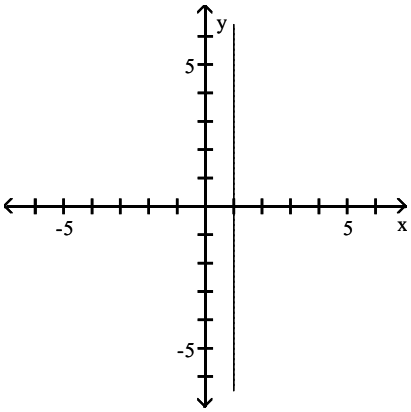
A)



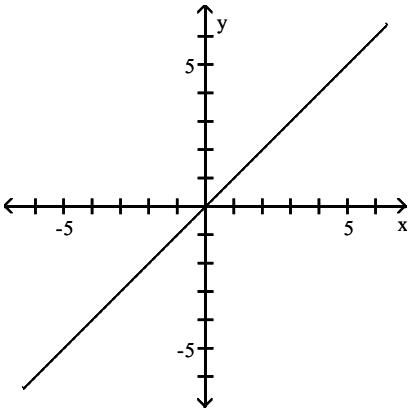
B)



C)



D)



Answer: A

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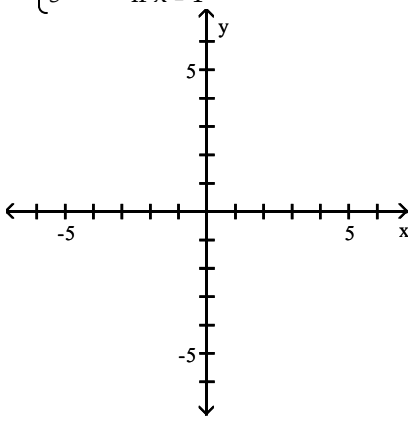
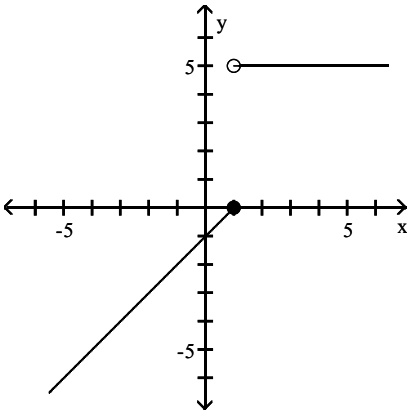
341)

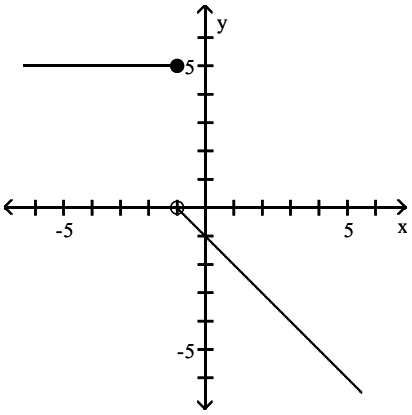
$$f(x) = \begin{cases} x - 1 & \text{if } x < 1 \\ 5 & \text{if } x \geq 1 \end{cases}$$



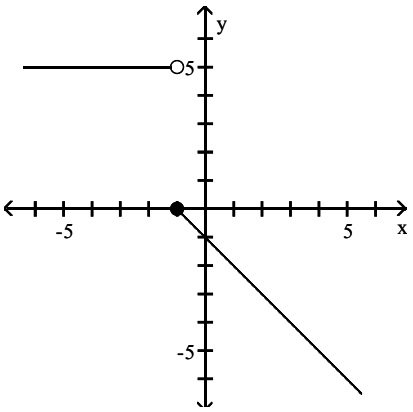
A)



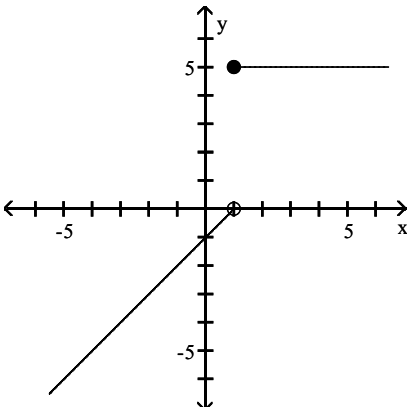
B)



C)



D)



Answer: D

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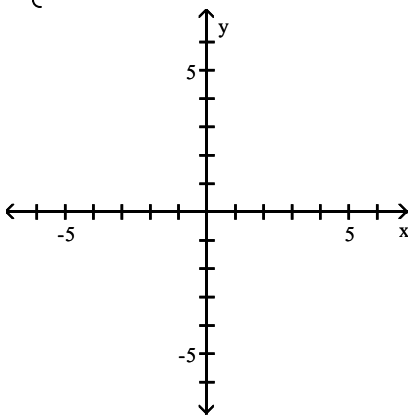
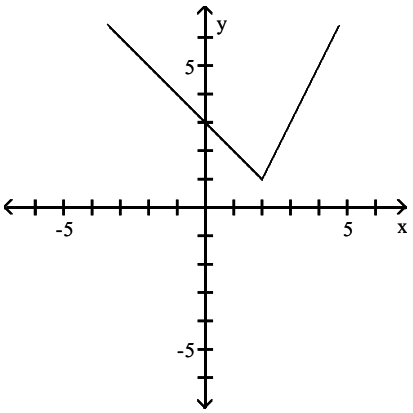
342)

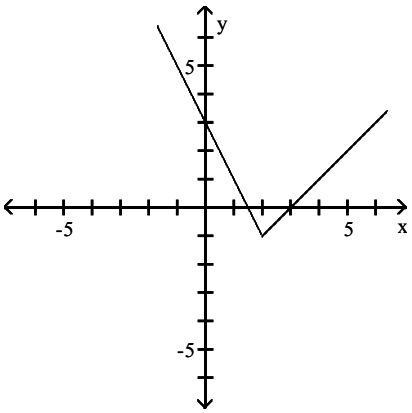
$$f(x) = \begin{cases} -x + 3 & \text{if } x < 2 \\ 2x - 3 & \text{if } x \geq 2 \end{cases}$$



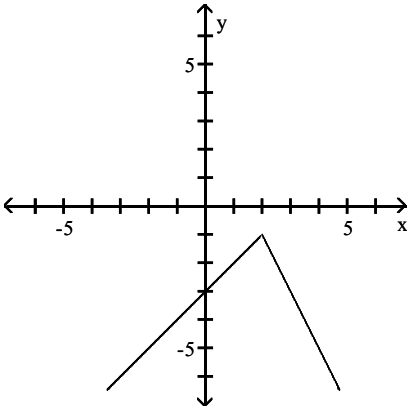
A)



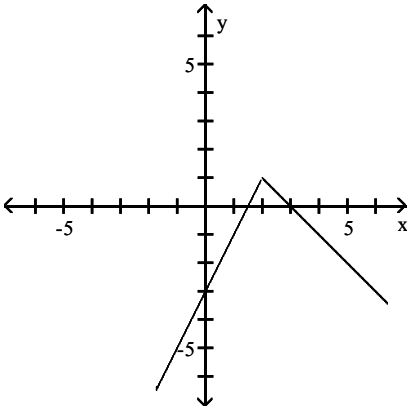
B)



C)



D)



Answer: A

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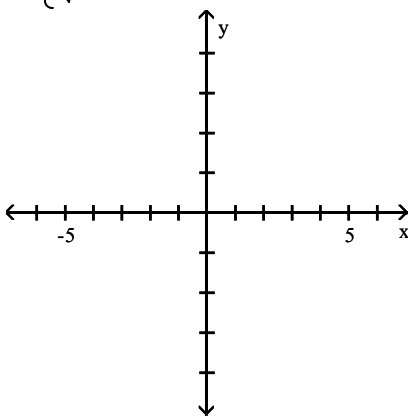
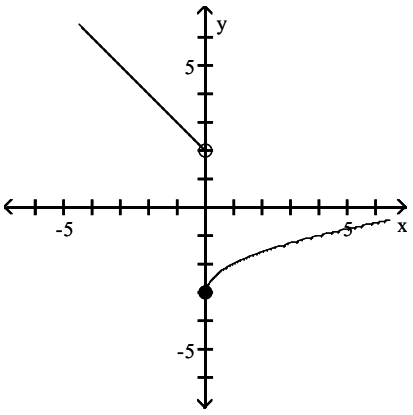
343)

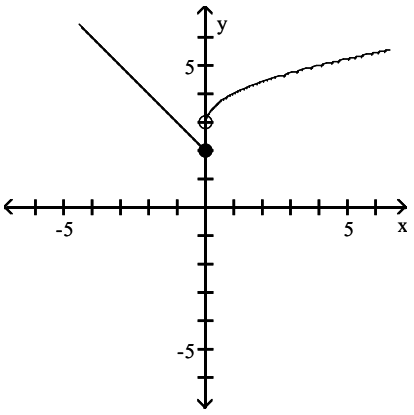
$$f(x) = \begin{cases} -x + 2 & x < 0 \\ \sqrt{x} + 3 & x \geq 0 \end{cases}$$



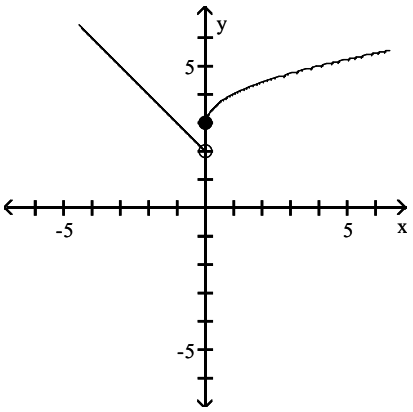
A)



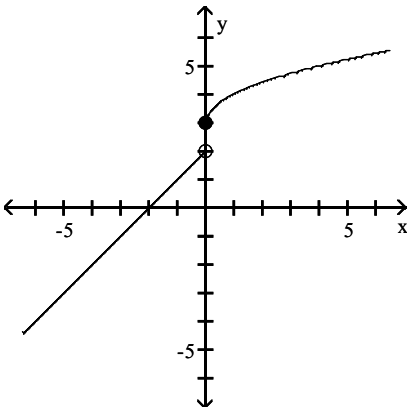
B)



C)



D)



Answer: C

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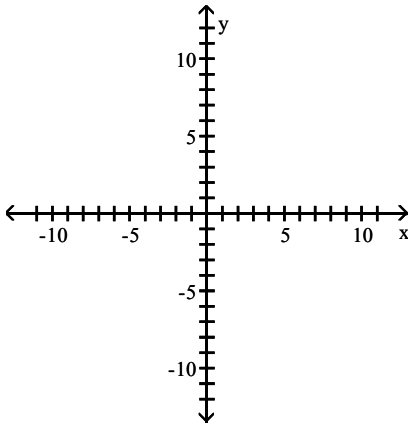
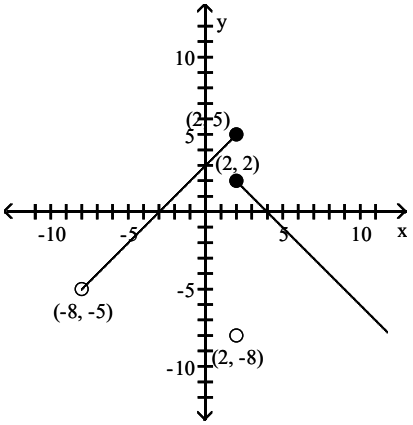
344)

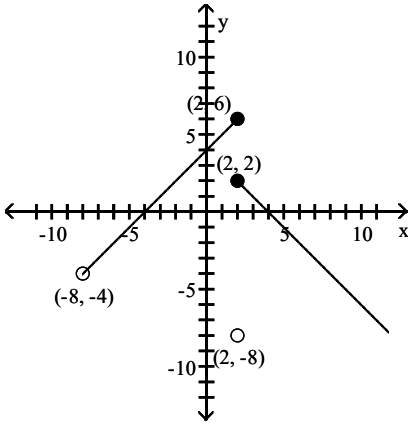
$$f(x) = \begin{cases} x + 3 & \text{if } -8 \le x < 2 \\ -8 & \text{if } x = 2 \\ -x + 4 & \text{if } x > 2 \end{cases}$$



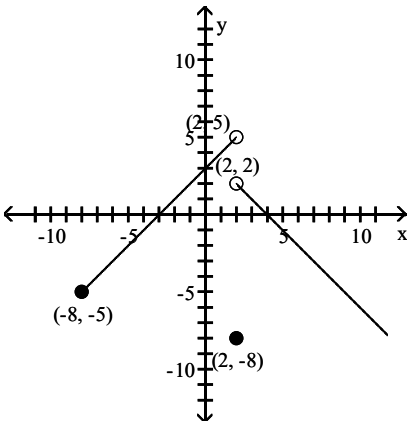
A)



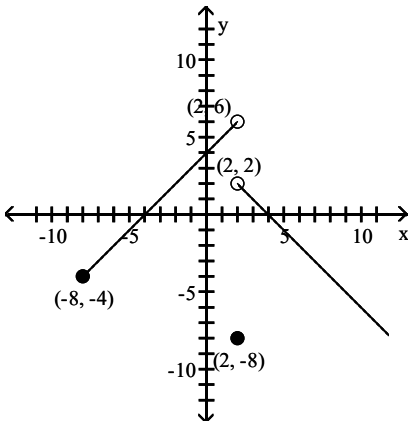
B)



C)



D)



Answer: C

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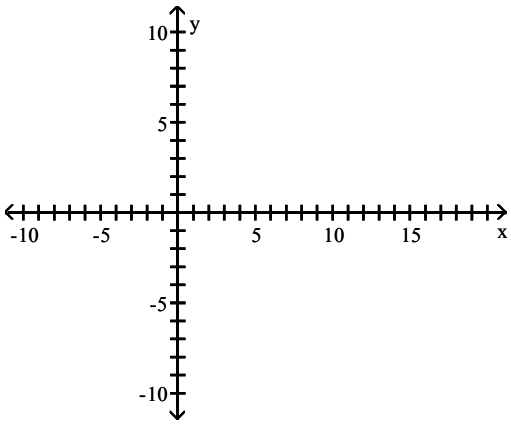
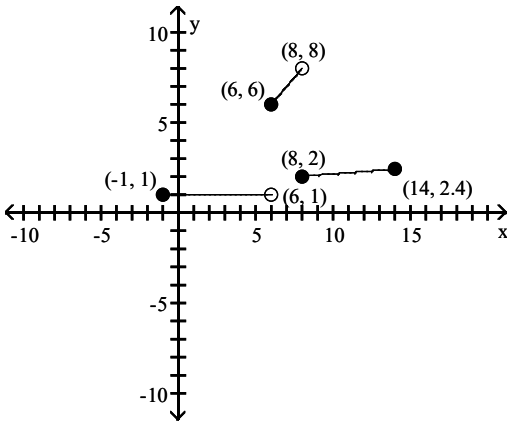
345)

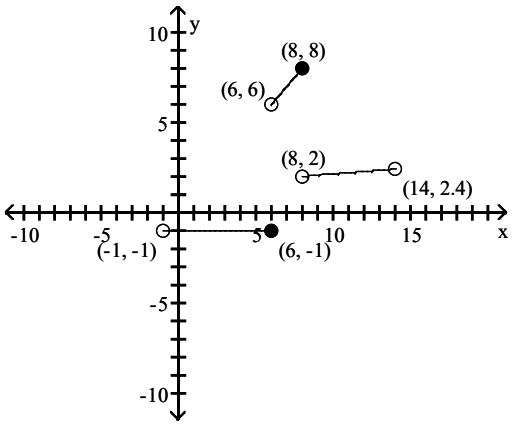
$$f(x) = \begin{cases} 1 & \text{if } -1 \le x < 6 \\ |x| & \text{if } 6 \le x < 8 \\ \sqrt[3]{x} & \text{if } 8 \le x \le 14 \end{cases}$$



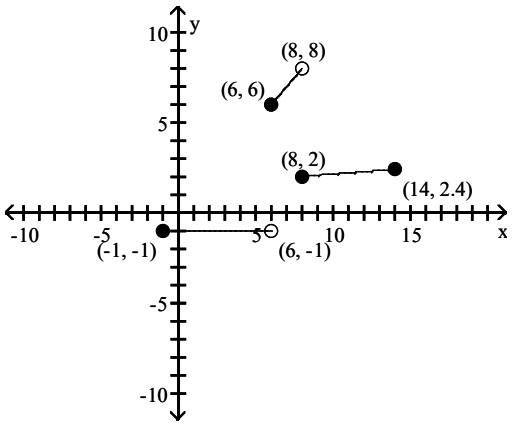
A)



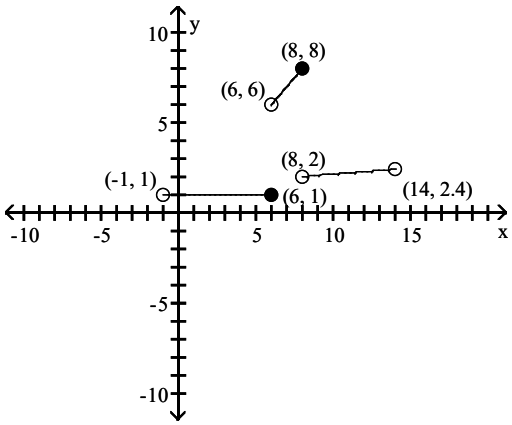
B)



C)



D)



Answer: A

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Find the domain of the function.

346)

$$f(x) = \begin{cases} -4x & \text{if } x \neq 0 \\ -1 & \text{if } x = 0 \end{cases}$$

A) $\{x \mid x \neq 0\}$ B) all real numbers C) $\{0\}$ D) $\{x \mid x \leq 0\}$

Answer: B

347)

$$f(x) = \begin{cases} 1 & \text{if } -3 \leq x < -1 \\ |x| & \text{if } -1 \leq x < 3 \\ \sqrt{x} & \text{if } 3 \leq x \leq 24 \end{cases}$$

A) $\{x \mid 3 \leq x \leq 24\}$ B) $\{x \mid x \geq -3\}$

C) $\{x \mid -3 \leq x \leq 24\}$ D) $\{x \mid -3 \leq x < 3 \text{ or } 3 < x \leq 24\}$

Answer: C

Locate any intercepts of the function.

348)

$$f(x) = \begin{cases} -2x + 7 & \text{if } x < 1 \\ 7x - 2 & \text{if } x \geq 1 \end{cases}$$

A) (0, 7) B) $(0, -2), (\frac{7}{2}, 0), (\frac{2}{7}, 0)$ C) $(0, 7), (\frac{7}{2}, 0), (\frac{2}{7}, 0)$ D) (0, –2)

Answer: A

349)

$$f(x) = \begin{cases} 1 & \text{if } -4 \leq x < -2 \\ |x| & \text{if } -2 \leq x < 4 \\ \sqrt{x} & \text{if } 4 \leq x \leq 29 \end{cases}$$

A) (0, 0), (1, 0) B) (0, 0), (0, 1) C) (0, 0) D) none

Answer: C

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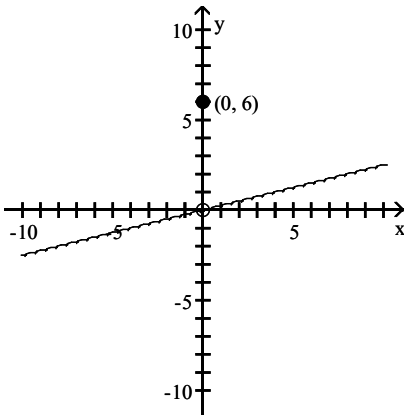
Based on the graph, find the range of y = f(x).

350)

$$f(x) = \begin{cases} \frac{1}{4}x & \text{if } x \neq 0 \\ 6 & \text{if } x = 0 \end{cases}$$

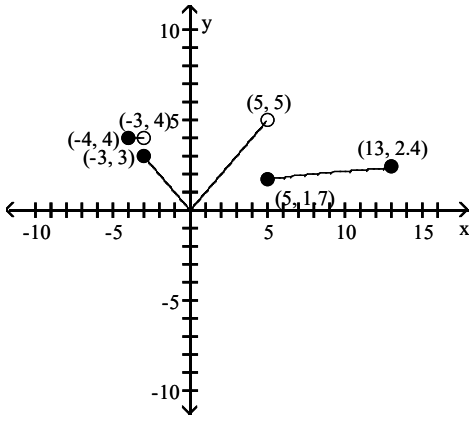


A) $(-\infty, 0)$ or $\{0\}$ or $(0, \infty)$
B) $(-\infty, 0)$ or $(0, \infty)$
C) $(-10, 10)$
D) $(-\infty, \infty)$

Answer: B

351)

$$f(x) = \begin{cases} 4 & \text{if } -4 \le x < -3 \\ |x| & \text{if } -3 \le x < 5 \\ \sqrt[3]{x} & \text{if } 5 \le x \le 13 \end{cases}$$



A) $[0, \sqrt[3]{13}]$
B) $[0, 5]$
C) $[0, \infty)$
D) $[0, 5)$

Answer: D

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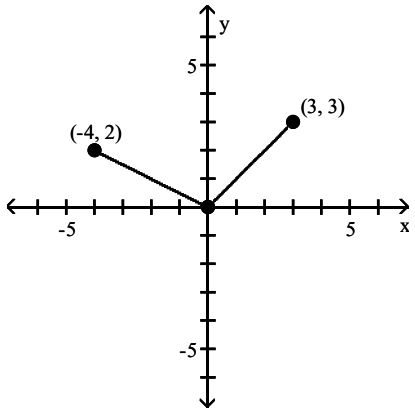
The graph of a piecewise-defined function is given. Write a definition for the function.

352)



A)
$$f(x) = \begin{cases} \frac{1}{2}x & \text{if } -4 < x < 0 \\ x & \text{if } 0 < x < 3 \end{cases}$$

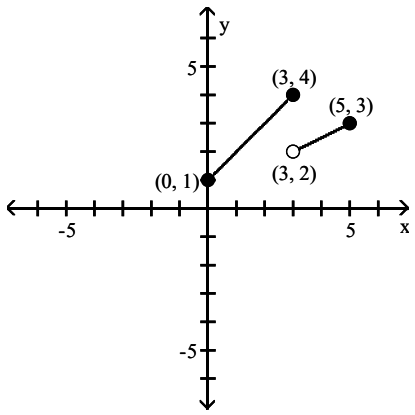
B)
$$f(x) = \begin{cases} -\frac{1}{2}x & \text{if } -4 < x < 0 \\ x & \text{if } 0 < x < 3 \end{cases}$$

C)
$$f(x) = \begin{cases} -2x & \text{if } -4 \le x \le 0 \\ x & \text{if } 0 < x \le 3 \end{cases}$$

D)
$$f(x) = \begin{cases} -\frac{1}{2}x & \text{if } -4 \le x \le 0 \\ x & \text{if } 0 < x \le 3 \end{cases}$$

Answer: D

353)



A)
$$f(x) = \begin{cases} x + 1 & \text{if } 0 \le x \le 3 \\ \frac{1}{2}x + 2 & \text{if } 3 < x \le 5 \end{cases}$$

B)
$$f(x) = \begin{cases} x + 1 & \text{if } 0 \le x \le 3 \\ \frac{1}{2}x & \text{if } 3 < x \le 5 \end{cases}$$

C)
$$f(x) = \begin{cases} x + 1 & \text{if } 0 \le x \le 3 \\ \frac{1}{2}x - \frac{1}{2} & \text{if } 3 < x \le 5 \end{cases}$$

D)
$$f(x) = \begin{cases} x + 1 & \text{if } 0 \le x \le 3 \\ \frac{1}{2}x + \frac{1}{2} & \text{if } 3 < x \le 5 \end{cases}$$

Answer: D

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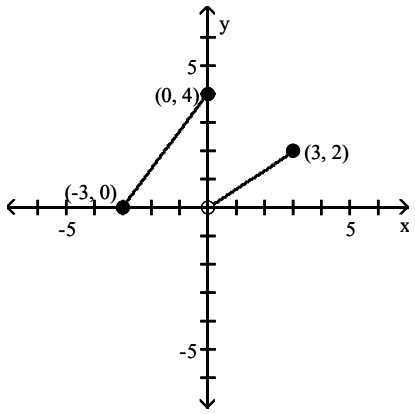
354)



A)
$$f(x) = \begin{cases} \frac{3}{4}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{3}{2}x & \text{if } 0 < x \le 3 \end{cases}$$

B)
$$f(x) = \begin{cases} \frac{4}{3}x - 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x & \text{if } 0 \le x \le 3 \end{cases}$$

C)
$$f(x) = \begin{cases} \frac{4}{3}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x + 2 & \text{if } 0 < x \le 3 \end{cases}$$

D)
$$f(x) = \begin{cases} \frac{4}{3}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x & \text{if } 0 < x \le 3 \end{cases}$$

Answer: D

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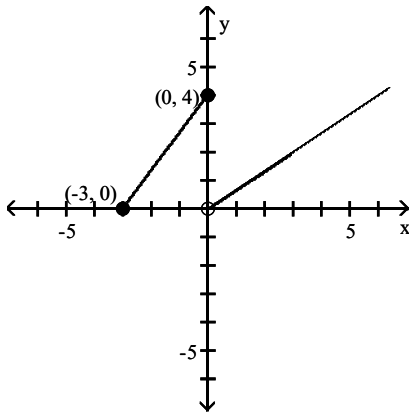
355)



A)
$$f(x) = \begin{cases} \frac{3}{4}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{3}{2}x & \text{if } x > 0 \end{cases}$$

B)
$$f(x) = \begin{cases} \frac{3}{4}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{3}{2}x & \text{if } x \ge 0 \end{cases}$$

C)
$$f(x) = \begin{cases} \frac{4}{3}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x & \text{if } 0 < x \le 3 \end{cases}$$

D)
$$f(x) = \begin{cases} \frac{4}{3}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x & \text{if } x > 0 \end{cases}$$

Answer: D

Solve the problem.

356) If f(x) = int(3x), find f(1.4).

A) 4 B) 2 C) 5 D) 1

Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

357) A gas company has the following rate schedule for natural gas usage in single–family residences:

Monthly service charge	\$8.80
Per therm service charge	
1st 25 therms	\$0.6686/therm
Over 25 therms	\$0.85870/therm

What is the charge for using 25 therms in one month?
What is the charge for using 45 therms in one month?
Construct a function that gives the monthly charge C for x therms of gas.

Answer: \$25.52
\$42.69
$$C(x) = \begin{cases} 8.8 + 0.6686x & \text{if } 0 \le x \le 25 \\ 4.0475 + 0.8587x & \text{if } x > 25 \end{cases}$$

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358) An electric company has the following rate schedule for electricity usage in single–family residences:

Monthly service charge	\$4.93
Per kilowatt service charge	
1st 300 kilowatts	\$0.11589/kW
Over 300 kilowatts	\$0.13321/kW

What is the charge for using 300 kilowatts in one month?
What is the charge for using 375 kilowatts in one month?
Construct a function that gives the monthly charge C for x kilowatts of electricity.

Answer: \$39.70
\$49.69

$$C(x) = \begin{cases} 4.93 + 0.11589x & \text{if } 0 \le x \le 300 \\ -0.266 + 0.13321x & \text{if } x > 300 \end{cases}$$

359) One Internet service provider has the following rate schedule for high–speed Internet service:

Monthly service charge	\$18.00
1st 50 hours of use	free
Next 50 hours of use	\$0.25/hour
Over 100 hours of use	\$1.00/hour

What is the charge for 50 hours of high–speed Internet use in one month?
What is the charge for 75 hours of high–speed Internet use in one month?
What is the charge for 135 hours of high–speed Internet use in one month?

Answer: \$18.00
\$24.25
\$65.50

360) The wind chill factor represents the equivalent air temperature at a standard wind speed that would produce the same heat loss as the given temperature and wind speed. One formula for computing the equivalent temperature is

$$W(t) = \begin{cases} t & \text{if } 0 \le v < 1.79 \\ 33 - \dfrac{(10.45 + 10\sqrt{v} - v)(33 - t)}{22.04} & \text{if } 1.79 \le v < 20 \\ 33 - 1.5958(33 - t) & \text{if } v \ge 20 \end{cases}$$

where v represents the wind speed (in meters per second) and t represents the air temperature (°C). Compute the wind chill for an air temperature of 15°C and a wind speed of 12 meters per second. (Round the answer to one decimal place.)

Answer: 6.0°C

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361) A cellular phone plan had the following schedule of charges:

Basic service, including 100 minutes of calls	$20.00 per month
2nd 100 minutes of calls	$0.075 per minute
Additional minutes of calls	$0.10 per minute

What is the charge for 200 minutes of calls in one month?
What is the charge for 250 minutes of calls in one month?
Construct a function that relates the monthly charge C for x minutes of calls.

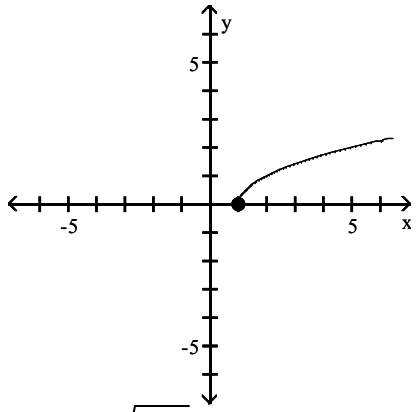
Answer: $27.50
$32.50;

$$C(x) = \begin{cases} 20 & \text{if } 0 \le x \le 100 \\ 12.5 + 0.075x & \text{if } 100 < x \le 200 \\ 7.5 + 0.1x & \text{if } x > 200 \end{cases}$$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Match the correct function to the graph.

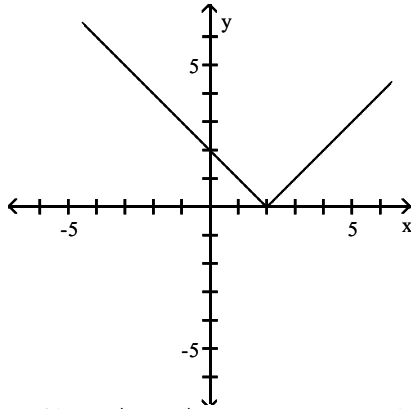
362)



A) $y = \sqrt{x + 1}$ B) $y = \sqrt{x}$ C) $y = \sqrt{x - 1}$ D) $y = x - 1$

Answer: C

363)



A) $y = |x + 2|$ B) $y = |1 - x|$ C) $y = |2 - x|$ D) $y = x - 2$

Answer: C

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Write the equation of a sine function that has the given characteristics.

364) The graph of $y = x^2$, shifted 6 units upward

A) $y = x^2 + 6$ B) $y = x^2 - 6$ C) $y = 6x^2$ D) $y = \frac{x^2}{6}$

Answer: A

365) The graph of $y = |x|$, shifted 6 units to the right

A) $y = |x - 6|$ B) $y = |x| - 6$ C) $y = |x + 6|$ D) $y = |x| + 6$

Answer: A

366) The graph of $y = |x|$, shifted 5 units upward

A) $y = |x + 5|$ B) $y = |x - 5|$ C) $y = |x| + 5$ D) $y = |x| - 5$

Answer: C

367) The graph of $y = \sqrt{x}$, shifted 3 units to the right

A) $y = \sqrt{x} - 3$ B) $y = \sqrt{x + 3}$ C) $y = \sqrt{x - 3}$ D) $y = \sqrt{x} + 3$

Answer: C

368) The graph of $y = \sqrt{x}$, shifted 2 units to the left

A) $y = \sqrt{x - 2}$ B) $y = \sqrt{x} + 2$ C) $y = \sqrt{x} - 2$ D) $y = \sqrt{x + 2}$

Answer: D

369) The graph of $y = \sqrt{x}$, shifted 5 units upward

A) $y = \sqrt{x - 5}$ B) $y = \sqrt{x + 5}$ C) $y = \sqrt{x} + 5$ D) $y = \sqrt{x} - 5$

Answer: C

370) The graph of $y = \sqrt{x}$, shifted 7 units downward

A) $y = \sqrt{x - 7}$ B) $y = \sqrt{x + 7}$ C) $y = \sqrt{x} + 7$ D) $y = \sqrt{x} - 7$

Answer: D

Suppose the point (2, 4) is on the graph of y = f(x). Find a point on the graph of the given function.

371) $y = f(x + 3)$

A) (2, 7) B) (2, 1) C) (–1, 4) D) (5, 4)

Answer: C

372) $f(x) + 4$

A) (2, –4) B) (–2, 4) C) (6, 4) D) (2, 8)

Answer: D

Solve the problem.

373) Suppose that the x–intercepts of the graph of $y = f(x)$ are 7 and 3. What are the x–intercepts of $y = f(x + 9)$?

A) 16 and 12 B) 7 and 12 C) –2 and –6 D) 63 and 27

Answer: C

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374) Suppose that the x–intercepts of the graph of y = f(x) are 8 and 6. What are the x–intercepts of y = f(x – 4)?

A) 8 and 2 B) 32 and 24 C) 12 and 10 D) 4 and 2

Answer: C

375) Suppose that the function y = f(x) is increasing on the interval (6, 8). Over what interval is the graph of y = f(x + 7) increasing?

A) (13, 15) B) (42, 56) C) (–1, 1) D) (6, 8)

Answer: C

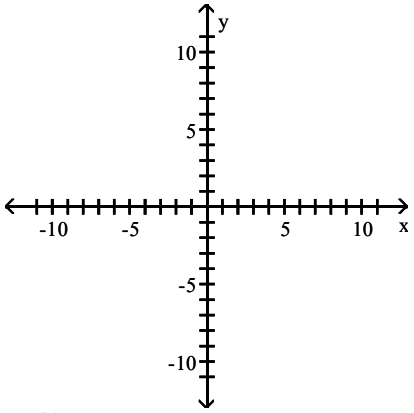
376) Suppose that the function y = f(x) is increasing on the interval (2, 4). Over what interval is the graph of y = f(x – 6) increasing?

A) (12 , 24) B) (2, 4) C) (–4, –2) D) (8, 10)

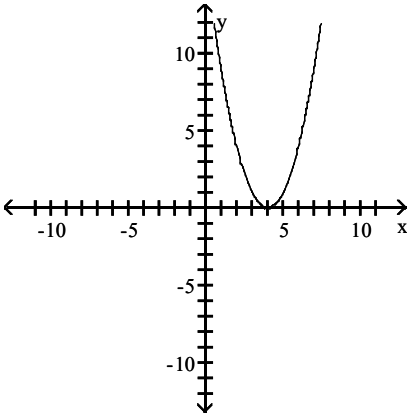
Answer: D

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

377) $f(x) = x^2 + 4$



A)



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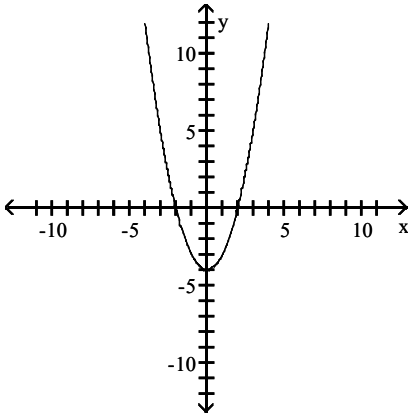

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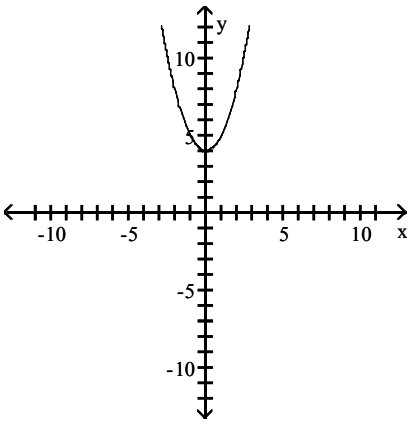
C)



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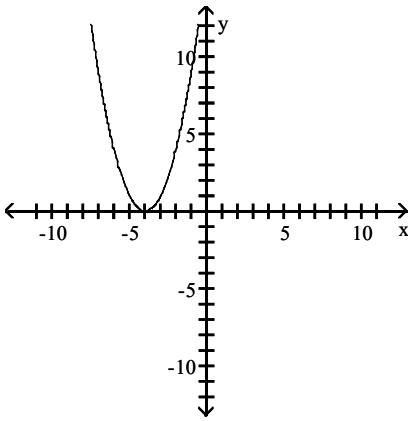
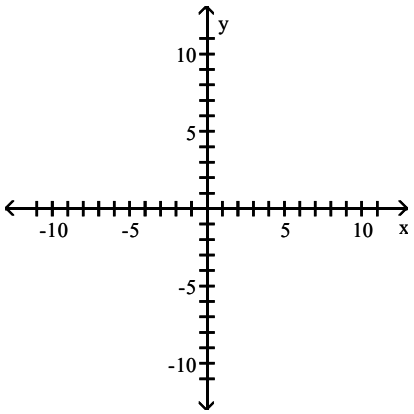
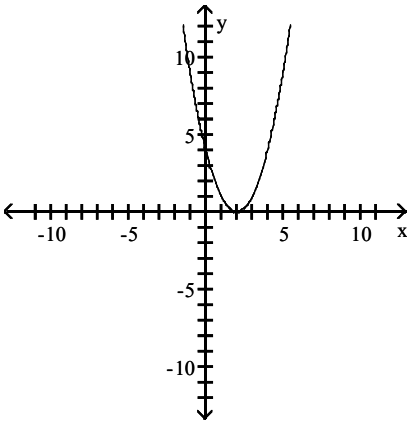


Answer: C

378) $f(x) = (x - 2)^2$



A)



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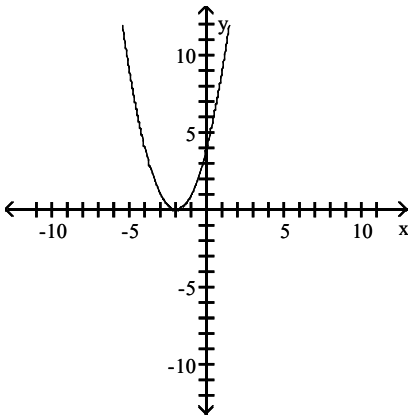

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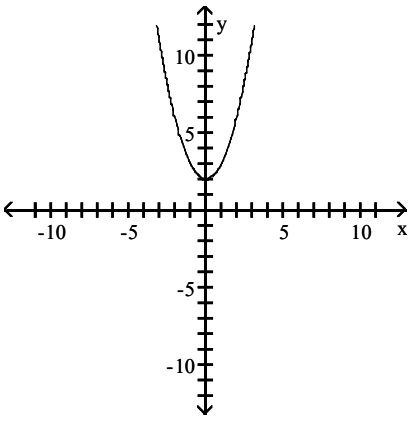
C)



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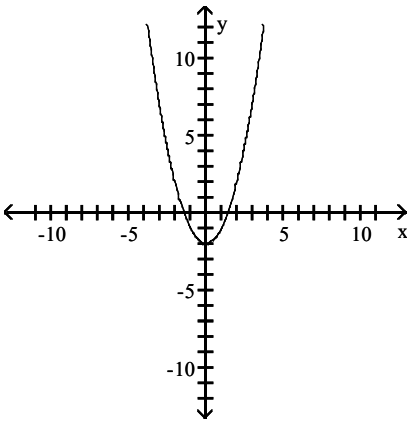
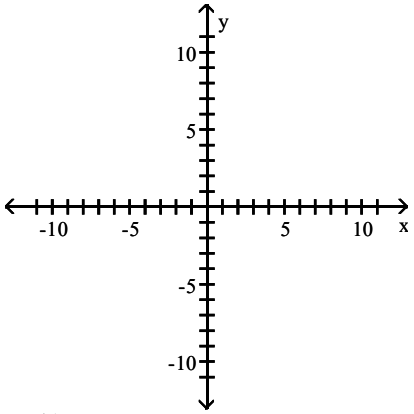
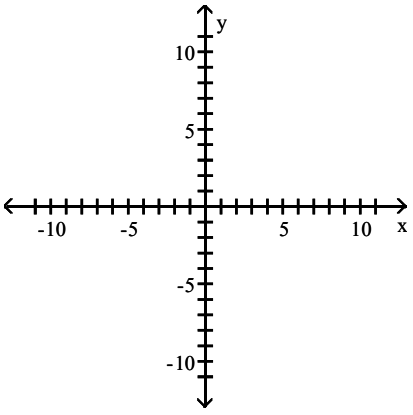


Answer: A

379) $f(x) = (x + 1)^2 + 6$



A)



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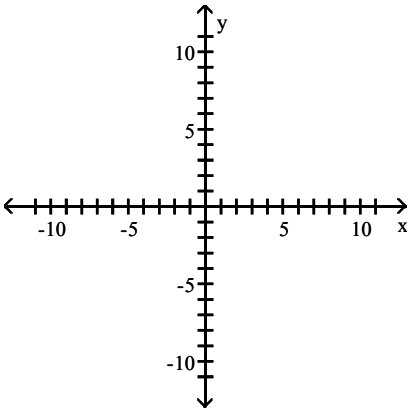

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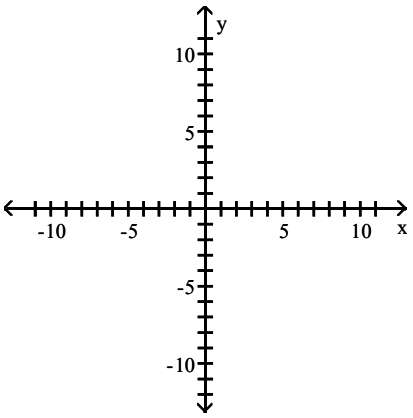
C)



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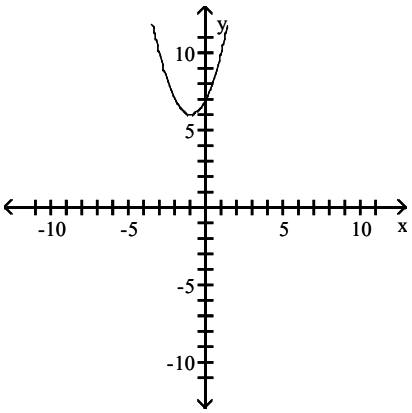
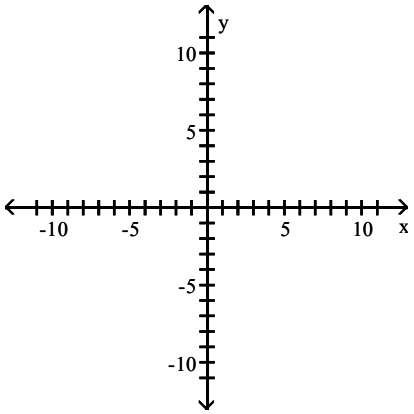
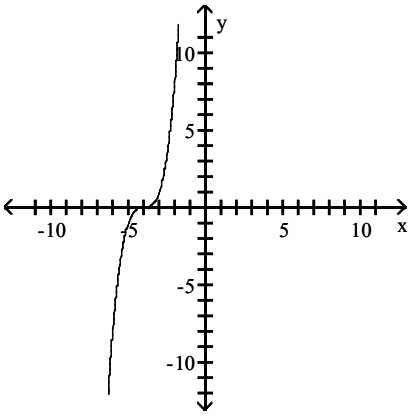


Answer: D

380) $f(x) = x^3 + 4$



A)



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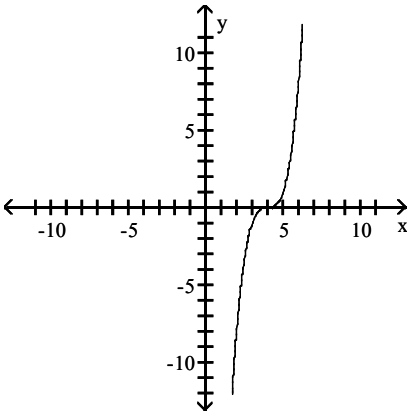

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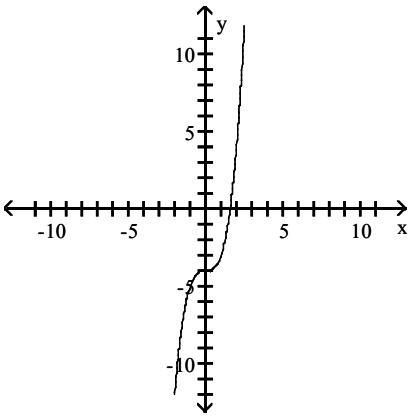
C)



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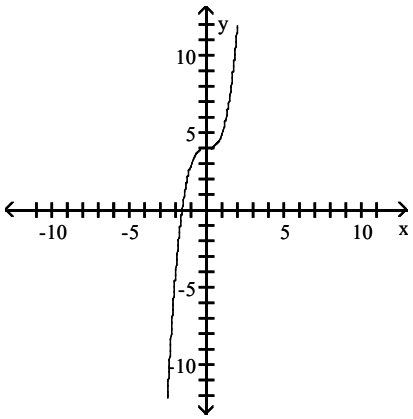
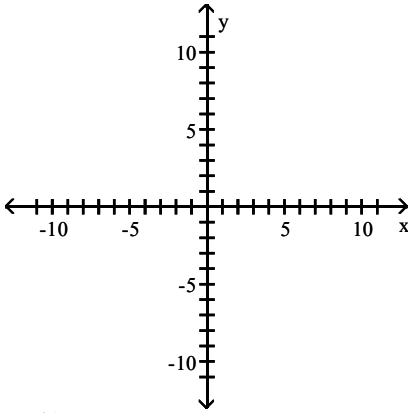
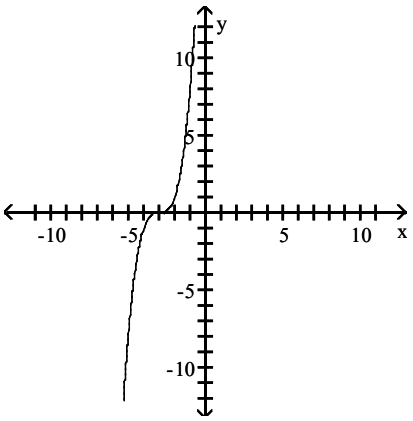


Answer: D

381) $f(x) = (x + 3)^3$



A)



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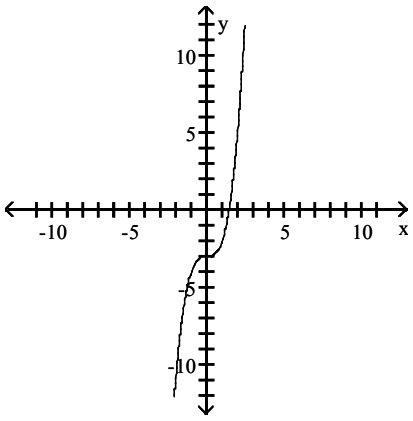

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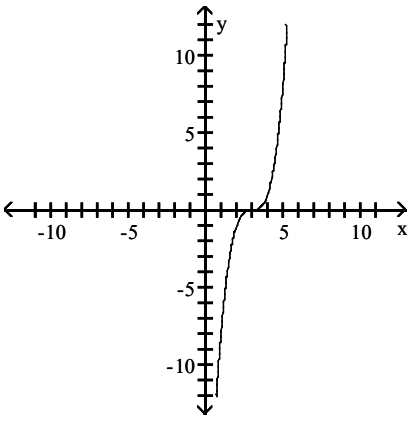
C)



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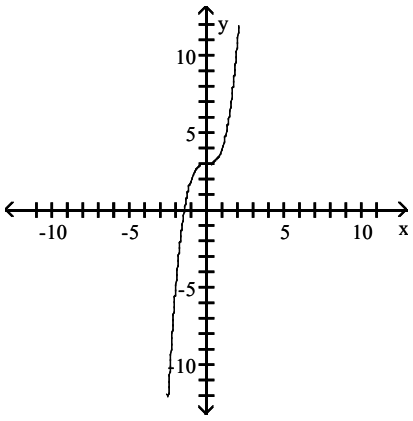
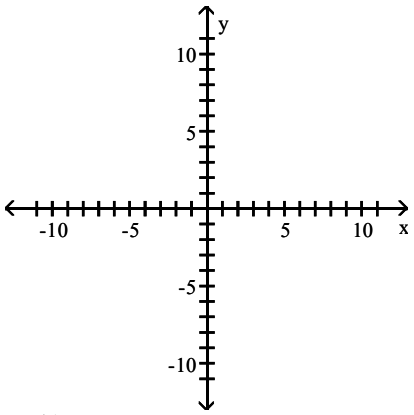
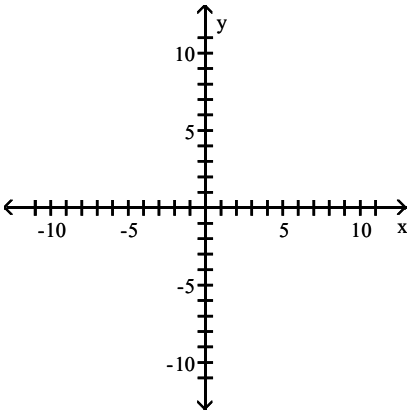


Answer: A

382) $f(x) = (x + 2)^3 - 4$



A)



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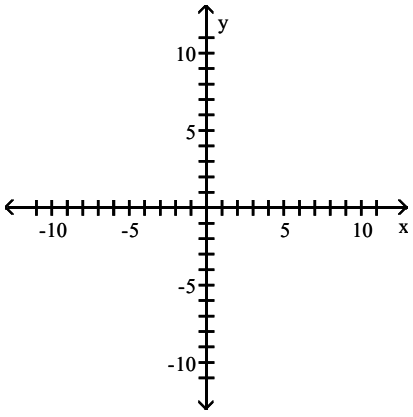

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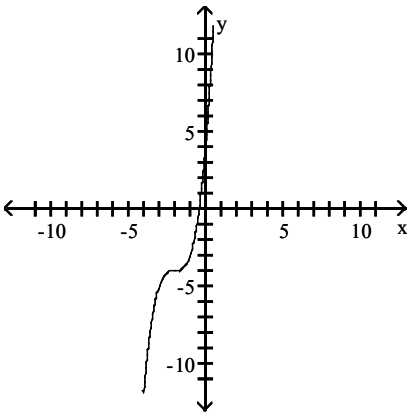
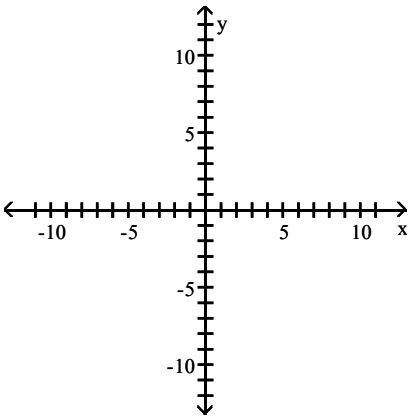
C)

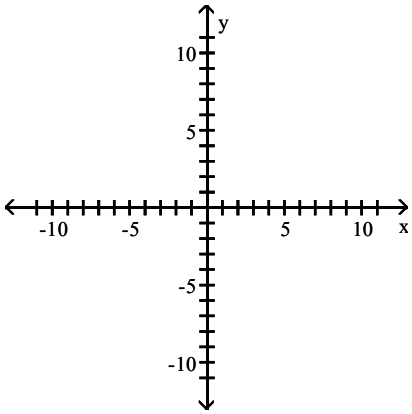


D)

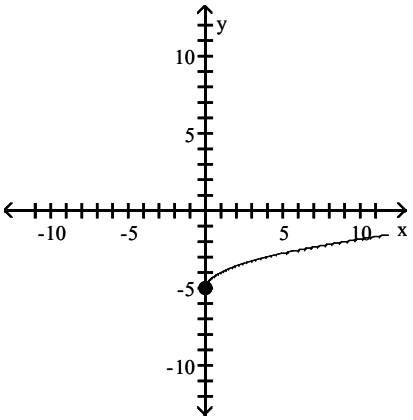


Answer: C

383) $f(x) = \sqrt{x} + 5$



A)



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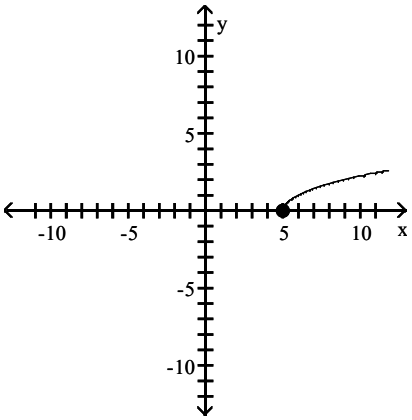

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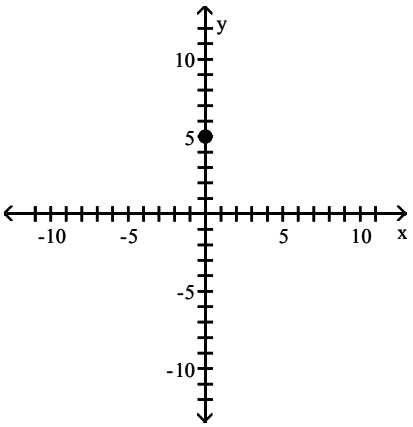
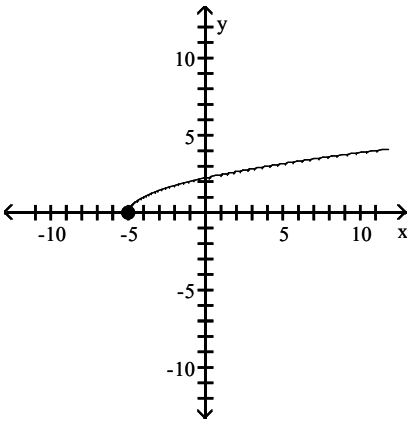
C)

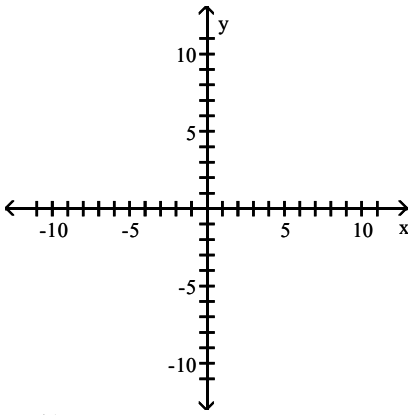


D)

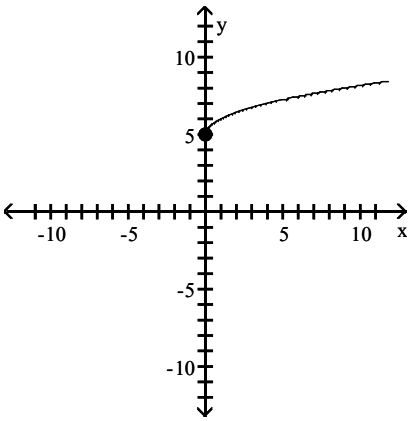


Answer: C

384) $f(x) = \sqrt{x - 5}$



A)



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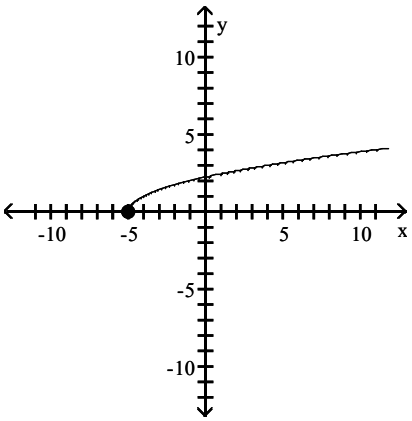

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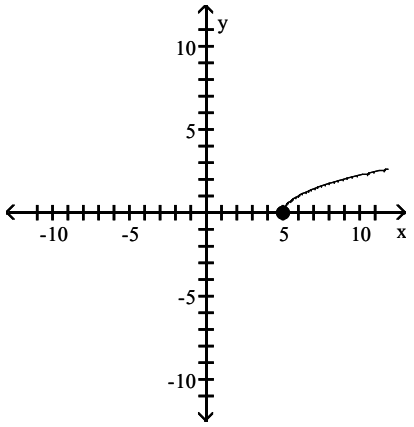
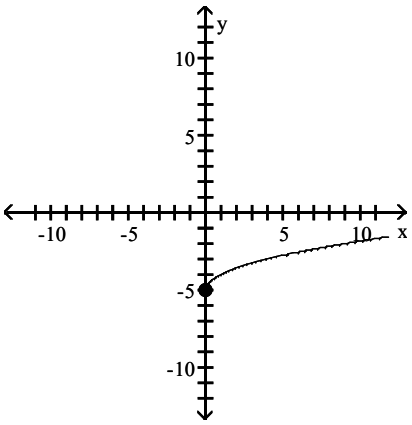
C)

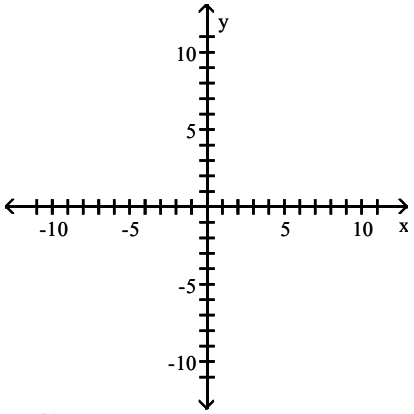


D)

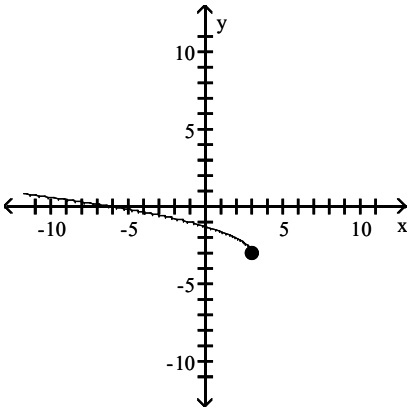


Answer: C

385) $f(x) = \sqrt{x + 3} - 3$



A)



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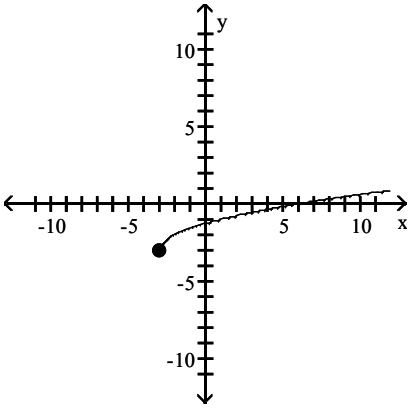

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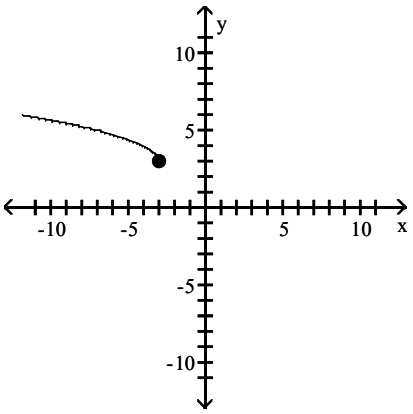
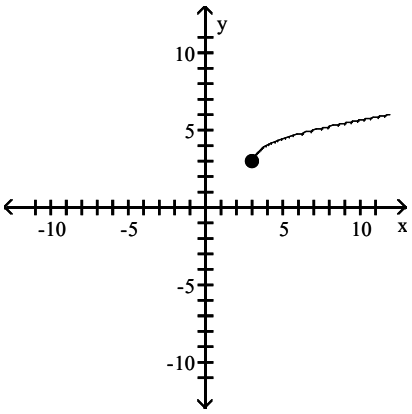
C)

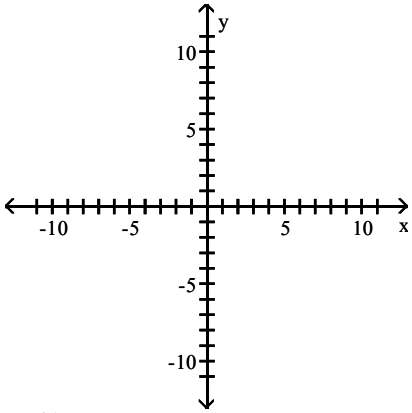


D)

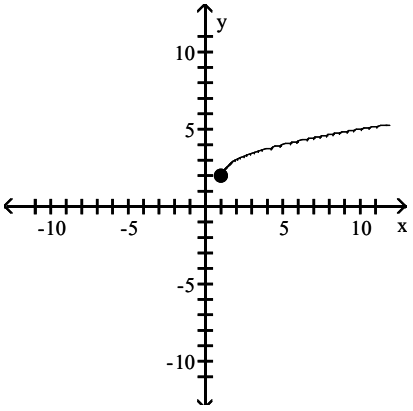


Answer: B

386) $f(x) = \sqrt{x + 1} - 2$



A)



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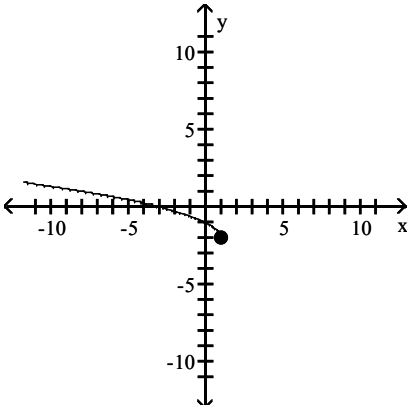

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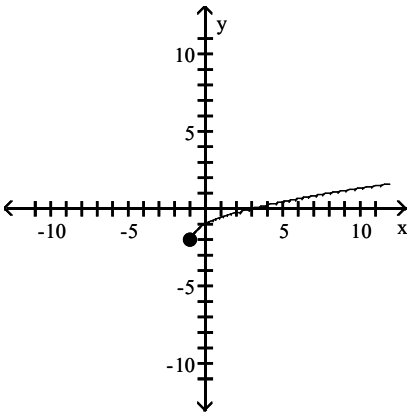
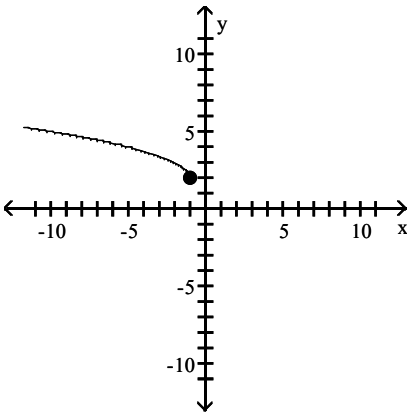
C)

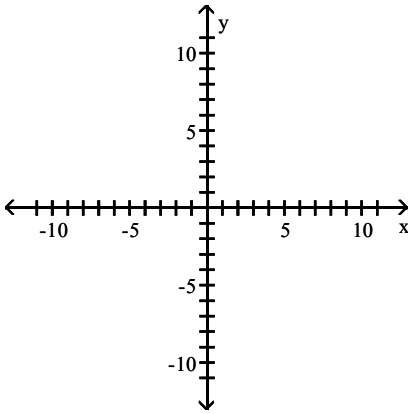


D)

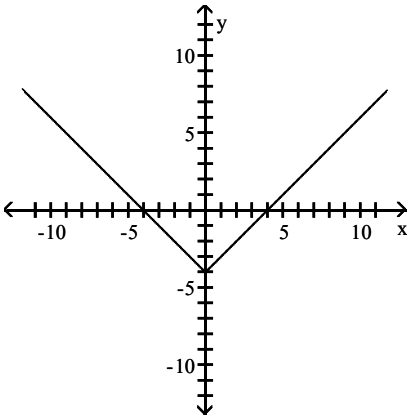


Answer: C

387) f(x) = |x| + 4



A)



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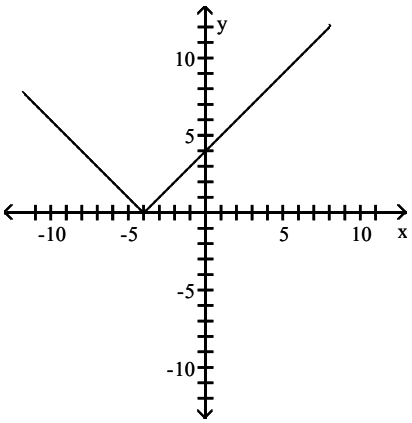

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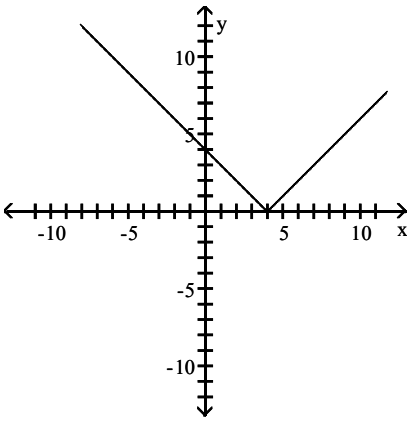
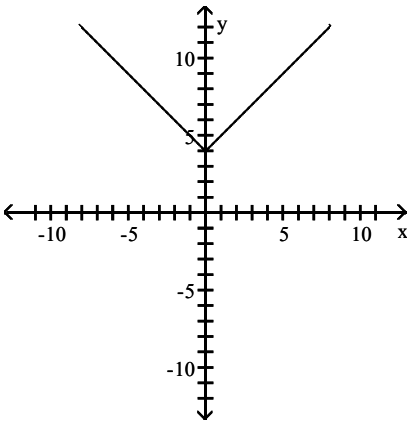
C)

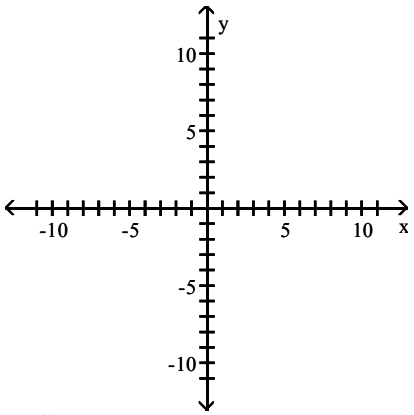


D)

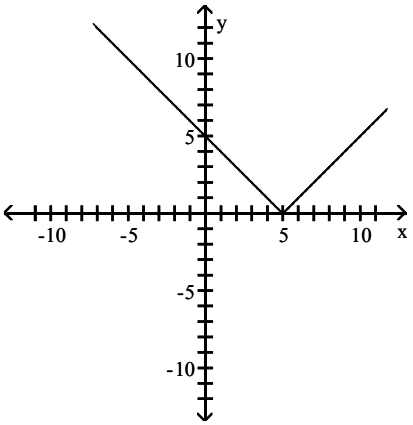


Answer: D

388) f(x) = |x – 5|



A)



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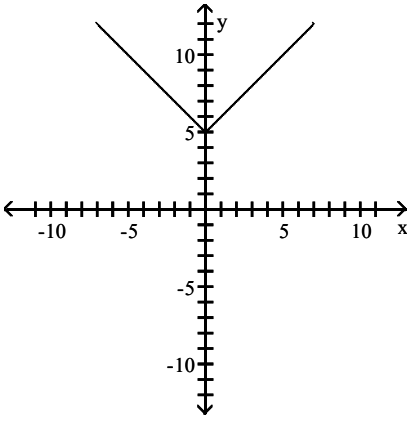

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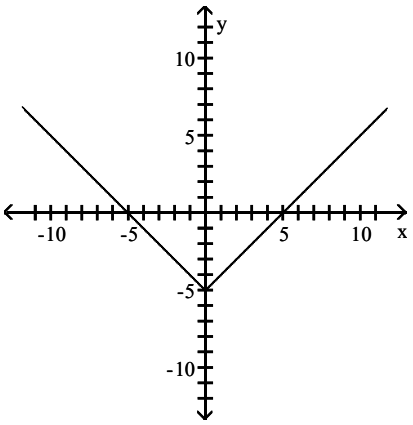
C)



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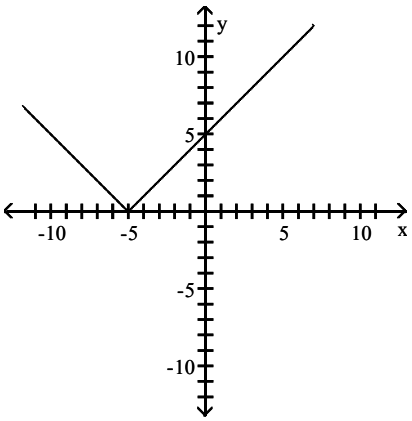
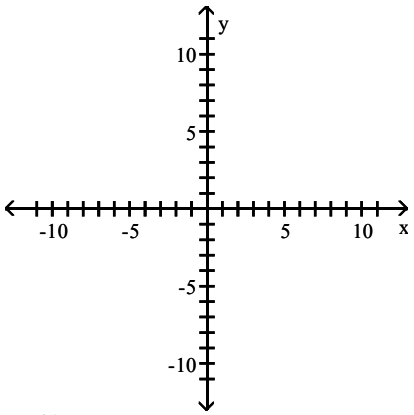
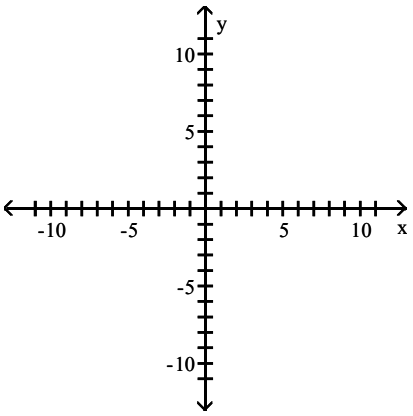


Answer: A

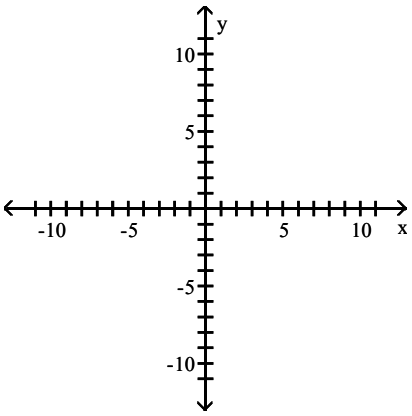
389) $f(x) = |x + 5| - 7$



A)



B)



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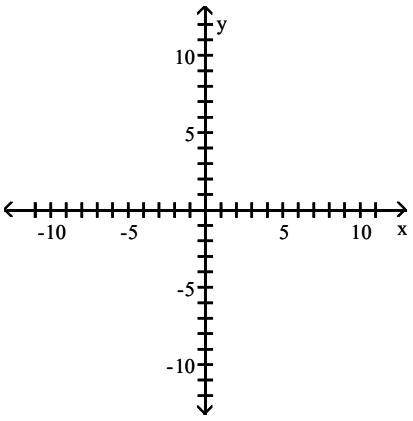
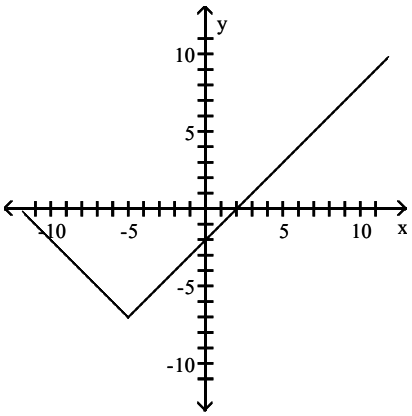
C)

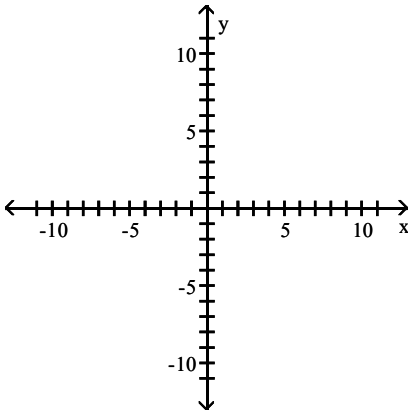


D)

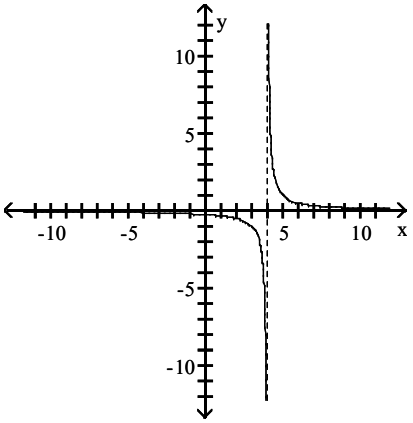


Answer: D

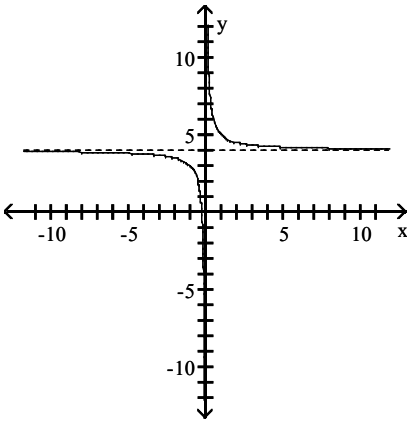
390) $f(x) = \frac{1}{x} - 4$



A)



B)



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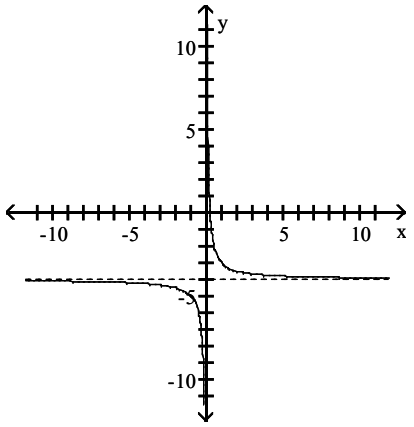
C)



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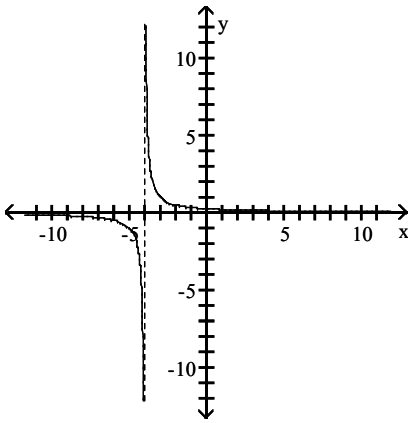
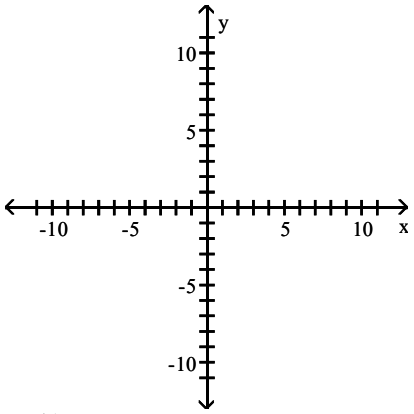
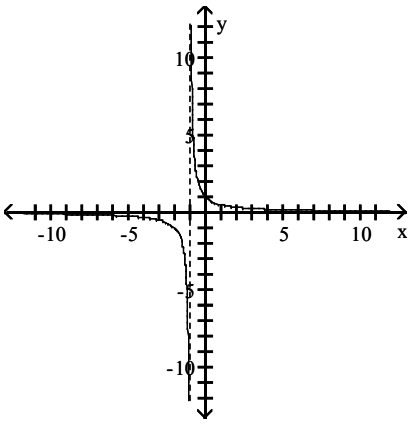


Answer: C

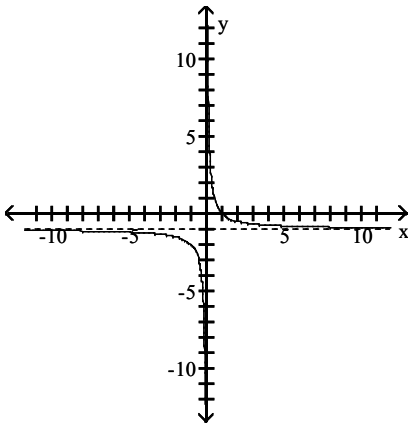
391) $f(x) = \dfrac{1}{x - 1}$



A)



B)



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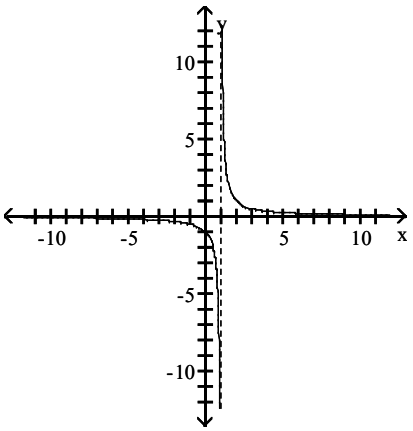
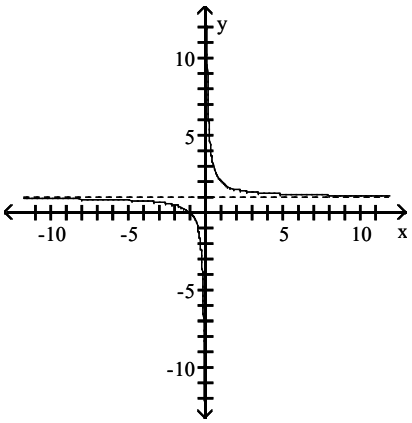
C)

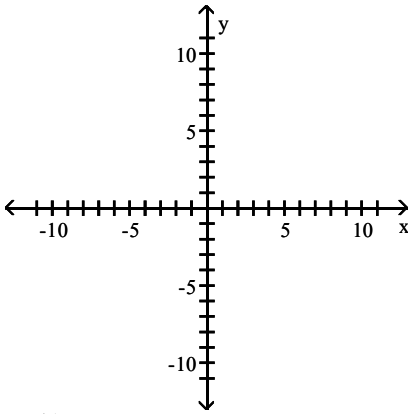


D)

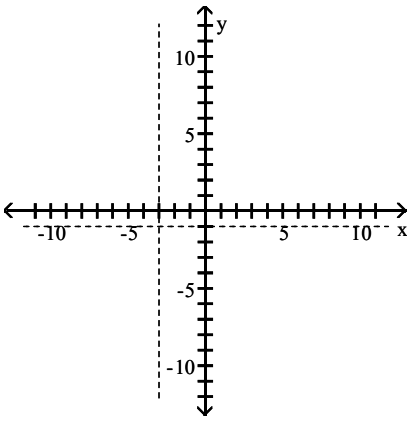


Answer: C

392) $f(x) = \frac{1}{x + 3} + 1$



A)



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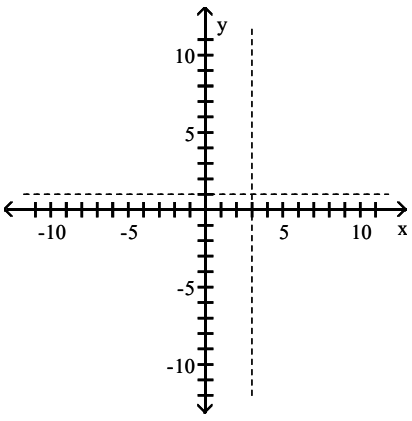

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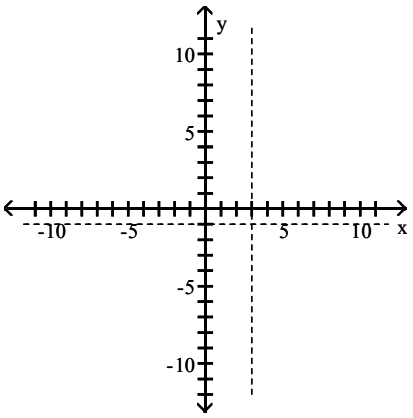
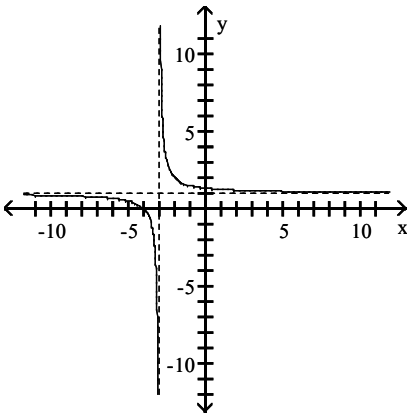
C)



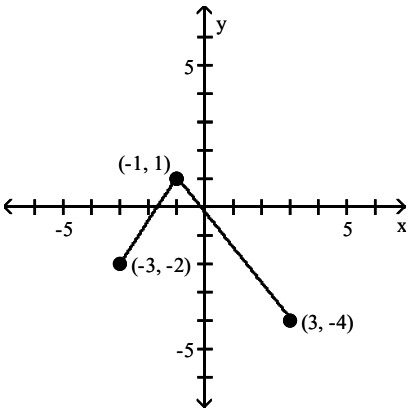
D)



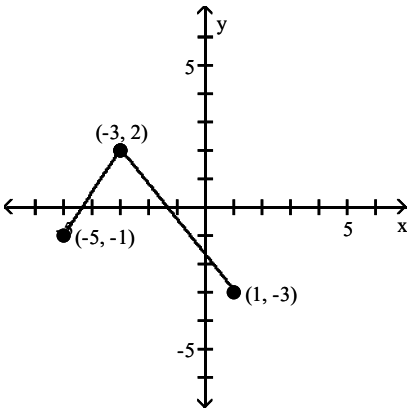
Answer: D

Using transformations, sketch the graph of the requested function.

393) The graph of a function f is illustrated. Use the graph of f as the first step toward graphing the function F(x), where F(x) = f(x + 2) – 1.



A)



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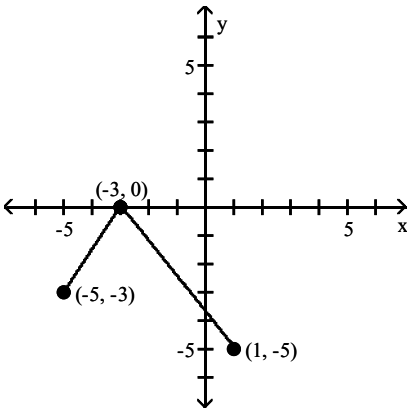

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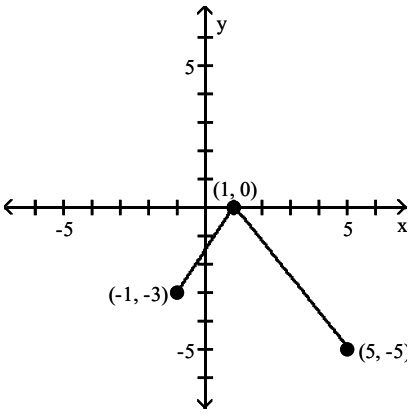
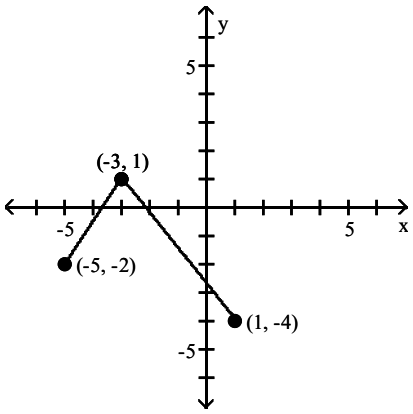
C)



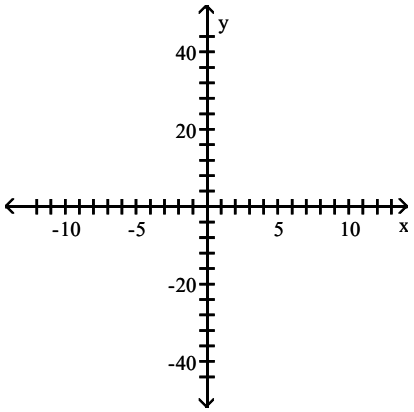
D)



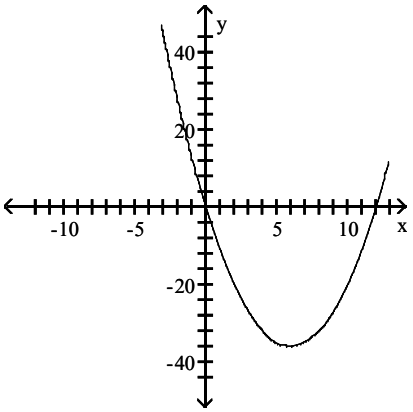
Answer: B

Complete the square and then use the shifting technique to graph the function.

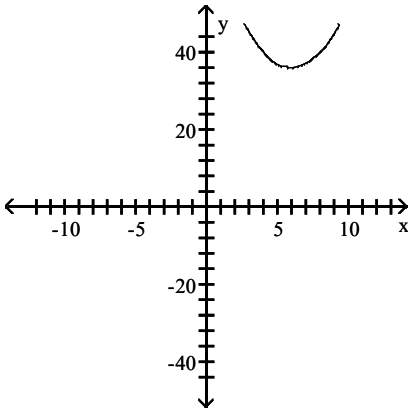
394) $f(x) = x^2 - 12x$



A)



B)



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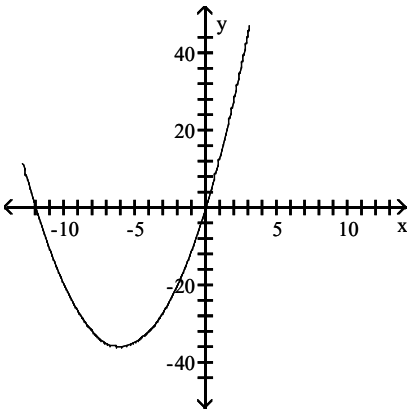
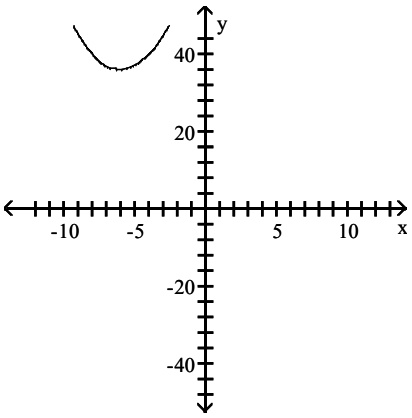
C)

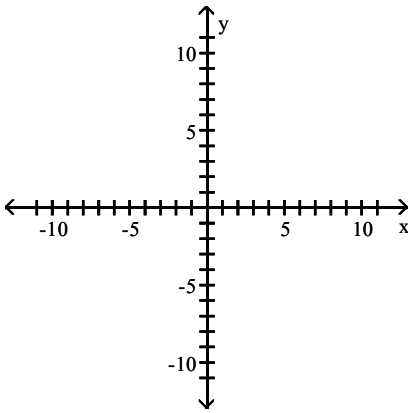


D)

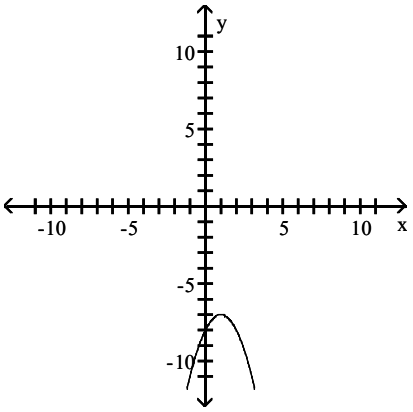


Answer: A

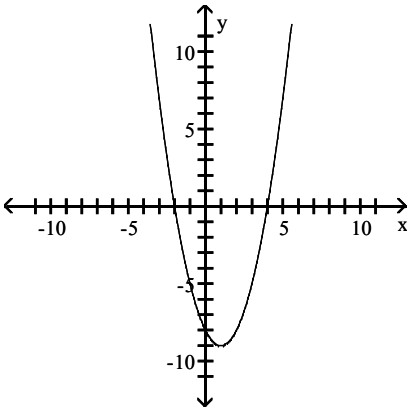
395) $f(x) = x^2 + 2x - 8$



A)



B)



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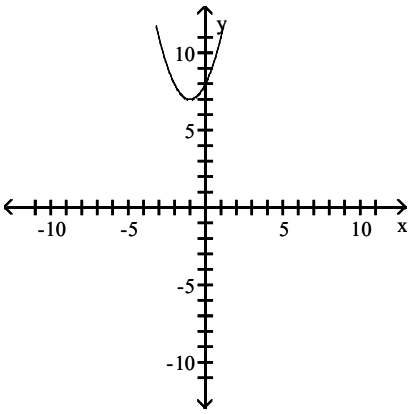
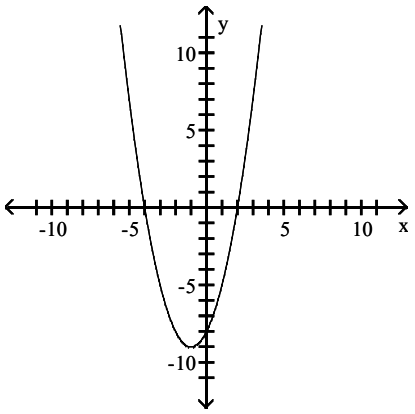
C)



D)



Answer: D

Solve the problem.

396) The following numerical representation for f computes the average number of hours of television watched per day based on year of birth x.

x	1975	1980	1983	1988	1990	1992	1995
f(x)	2	2.5	3	3.5	4	3.5	4

Give a numerical representation for a function g that computes the average number of hours of television watched per day for the year x, where x = 0 corresponds to the birth year 1975. Write an equation that shows the relationship between f(x) and g(x).

A)

x	0	5	8	13	15	17	20
g(x)	2	2.5	3	3.5	4	3.5	4

f(x) = g(x + 1975)

B)

x	75	80	83	88	90	92	95
g(x)	2	2.5	3	3.5	4	3.5	4

f(x) = g(x – 1900)

C)

x	0	5	8	13	15	17	20
g(x)	2	2.5	3	3.5	4	3.5	4

f(x) = g(x) – 1975

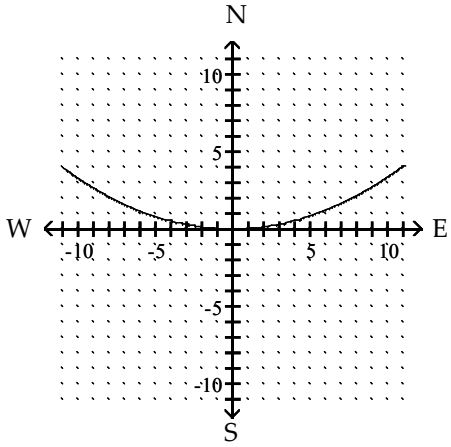
D)

x	0	5	8	13	15	17	20
g(x)	2	2.5	3	3.5	4	3.5	4

f(x) = g(x – 1975)

Answer: D

397) Suppose a cold front is passing through the United States at noon with a shape described by the function $y = \frac{1}{30}x^2$, where each unit represents 100 miles. St. Louis, Missouri is located at (0, 0), and the positive y–axis points north.



Suppose the front moves south 340 miles and west 120 miles and maintains its shape. Give the equation for the new front and plot the new position of the front.

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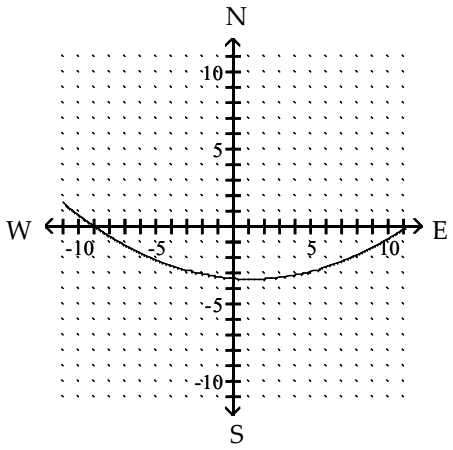
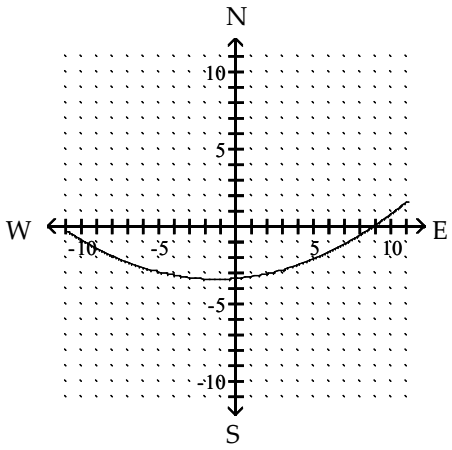
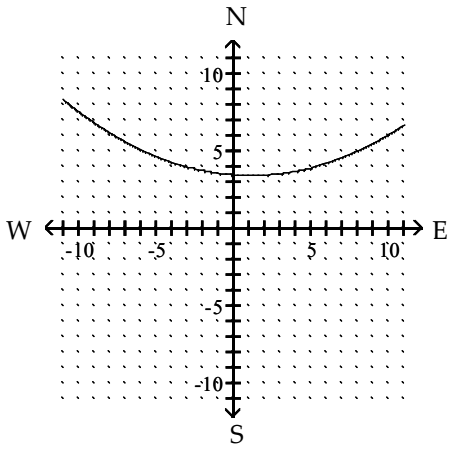
A) $y = \frac{1}{30}(x - 1.2)^2 - 3.4$



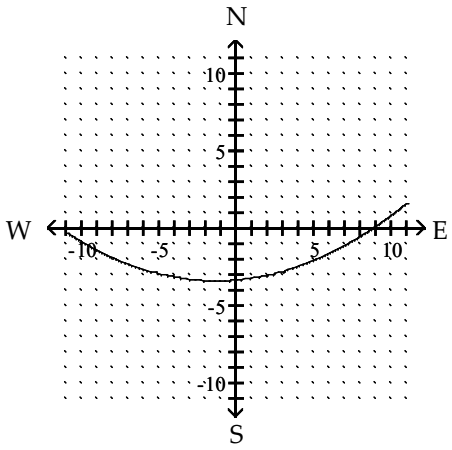
B) $y = \frac{1}{30}(x + 1.2)^2 - 3.4$



C) $y = \frac{1}{30}(x - 1.2)^2 + 3.4$



D) $y = -\frac{1}{30}(x + 1.2)^2 - 3.4$



Answer: B

Write the equation that results in the desired transformation.

398) The graph of $y = x^2$, vertically stretched by a factor of 10

A) $y = (x - 10)^2$ B) $y = -10x^2$ C) $y = 10x^2$ D) $y = 10(x - 10)x^2$

Answer: C

399) The graph of $y = x^3$, vertically compressed by a factor of 0.4

A) $y = (x + 0.4)^3$ B) $y = (x - 0.4)^3$ C) $y = 0.4x^3$ D) $y = 0.4\sqrt[3]{x}$

Answer: C

Suppose the point (2, 4) is on the graph of y = f(x). Find a point on the graph of the given function.

400) $y = 4f(x)$

A) (5, 3) B) (3, 8) C) (8, 4) D) (2, 16)

Answer: D

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Solve the problem.

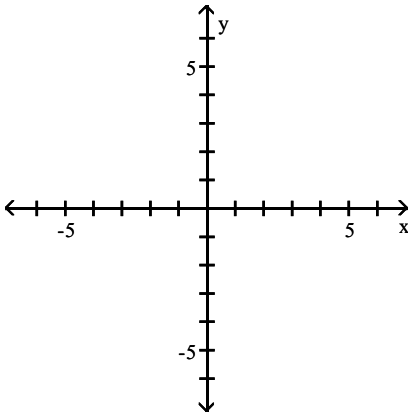
401) Suppose that the x–intercepts of the graph of y = f(x) are 7 and 5. What are the x–intercepts of y = 9f(x)?

A) 35 and 45 B) 16 and 14 C) 7 and 5 D) –2 and –4

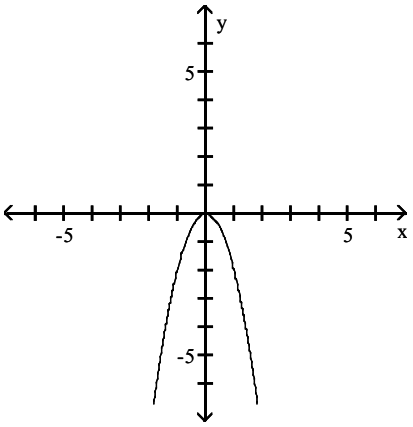
Answer: C

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

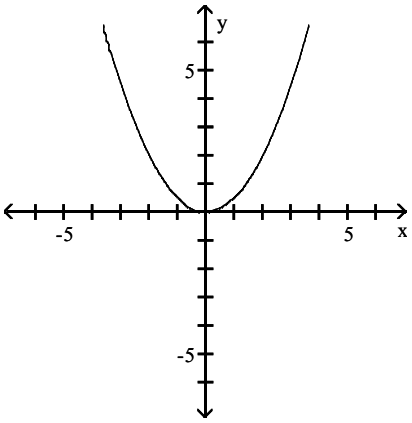
402) $f(x) = 2x^2$



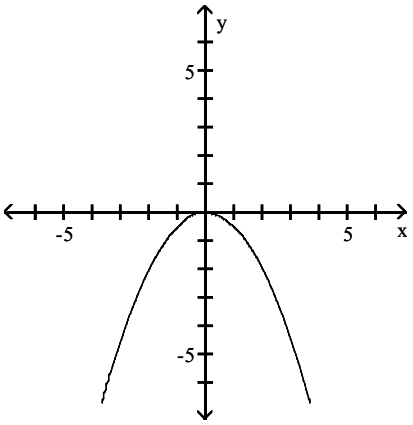
A)



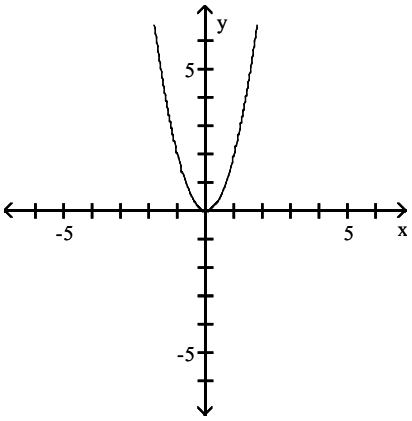
B)



C)



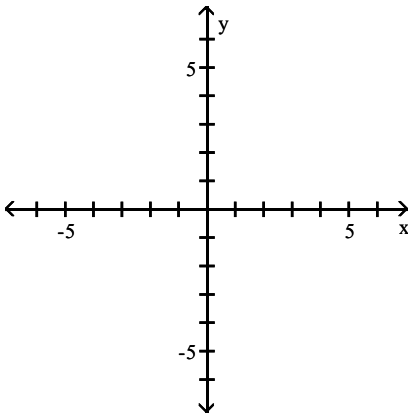
D)



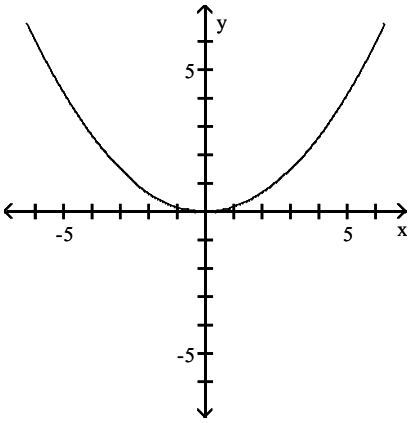
Answer: D

Access Complete Test Bank for Trigonometry 11th Sullivan

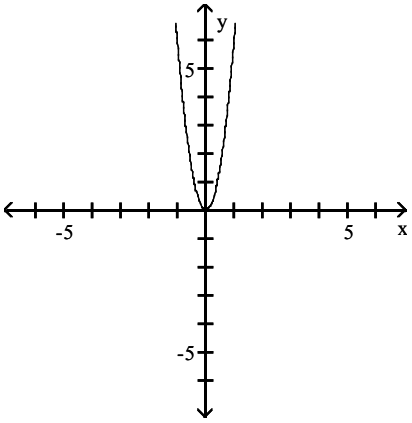
403) $f(x) = \frac{1}{6}x^2$



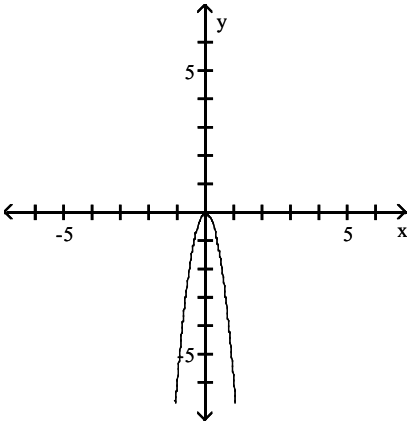
A)



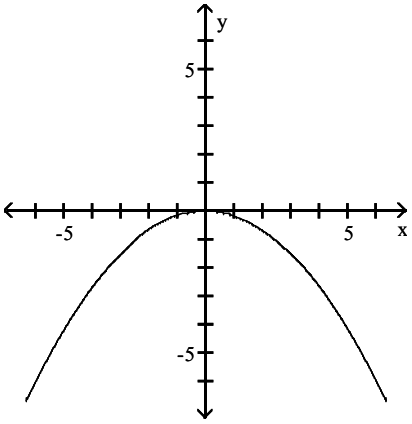
B)



C)



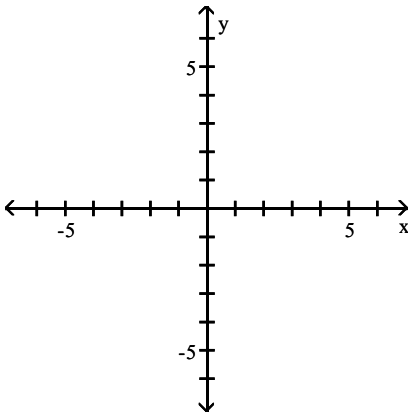
D)



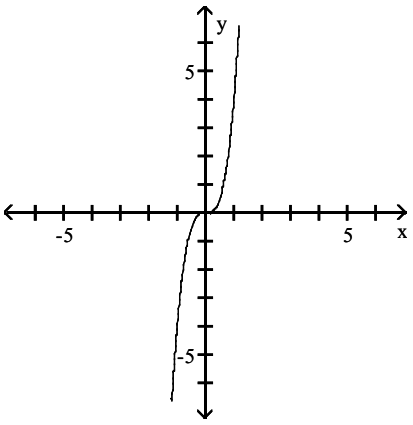
Answer: A

Access Complete Test Bank for Trigonometry 11th Sullivan

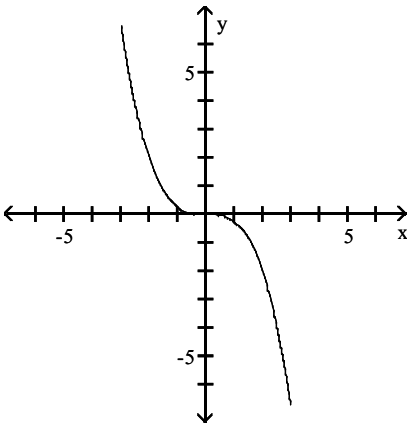
404) $f(x) = 4x^3$



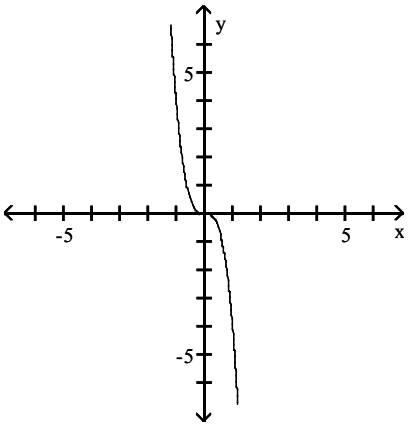
A)



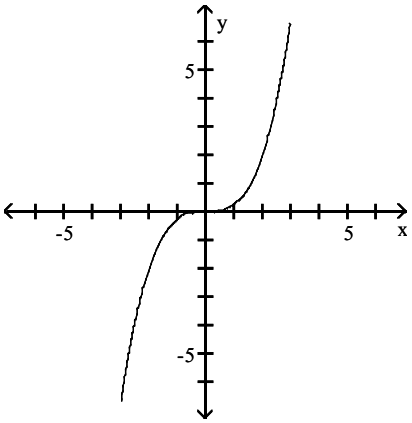
B)



C)



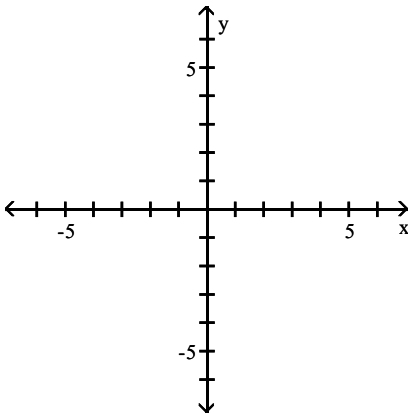
D)



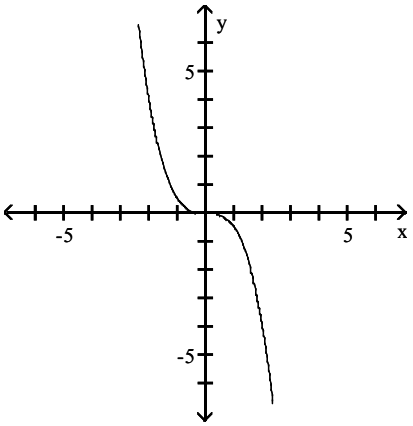
Answer: A

Access Complete Test Bank for Trigonometry 11th Sullivan

405) $f(x) = \frac{1}{2}x^3$



A)



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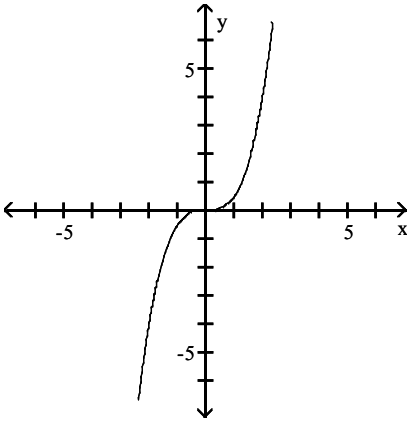
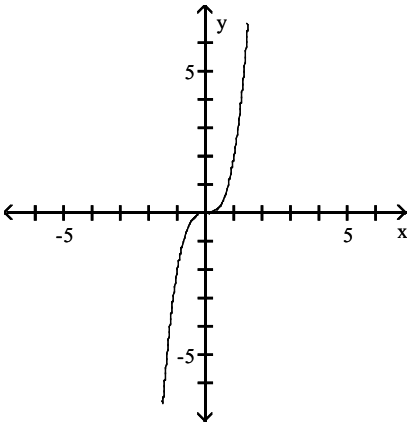
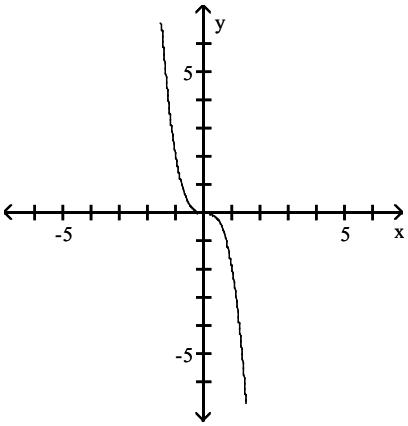


C)



D)



Answer: B

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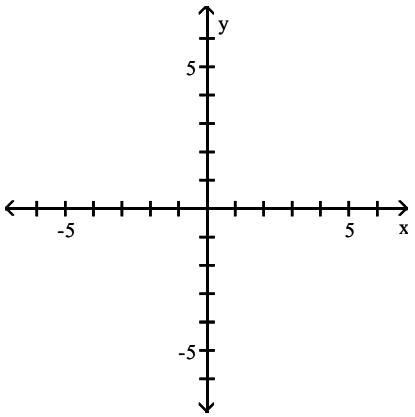
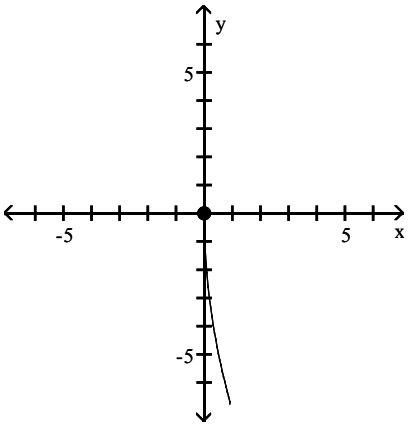
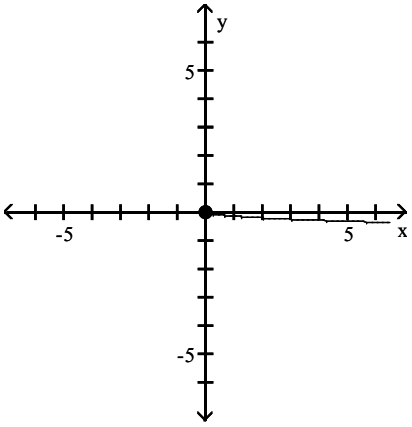
406) $f(x) = 7\sqrt{x}$



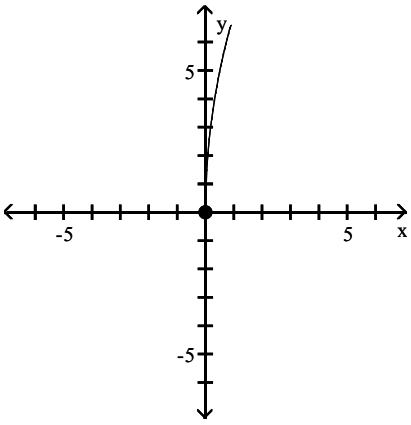
A)



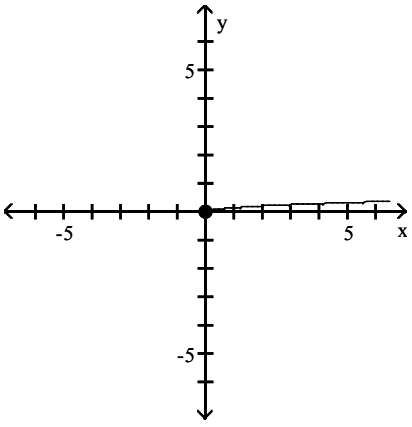
B)



C)



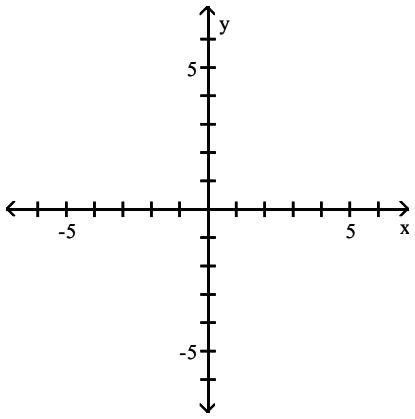
D)



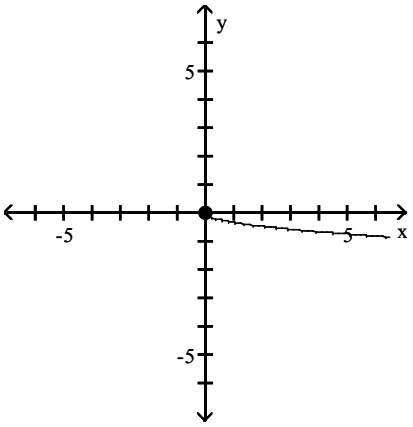
Answer: C

Access Complete Test Bank for Trigonometry 11th Sullivan

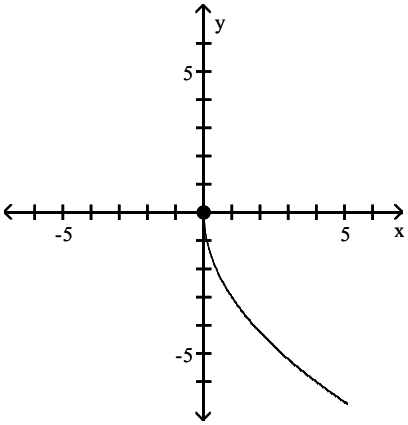
407) $f(x) = \frac{1}{3}\sqrt{x}$



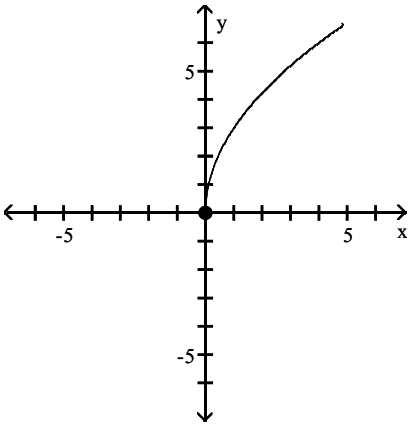
A)



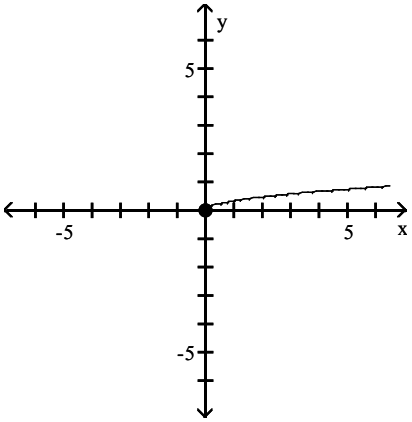
B)



C)



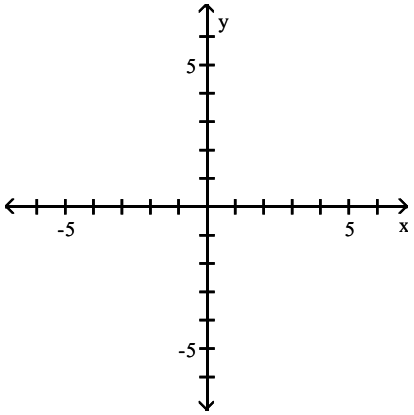
D)



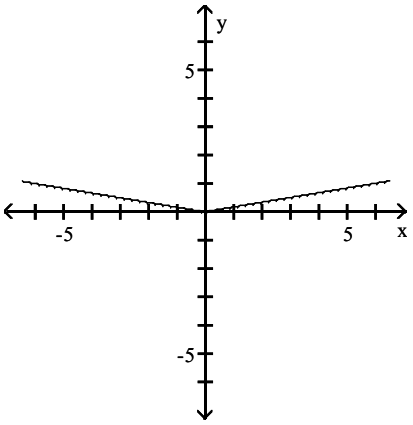
Answer: D

Access Complete Test Bank for Trigonometry 11th Sullivan

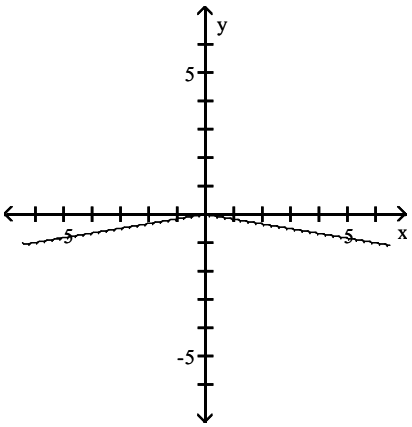
408) $f(x) = 6|x|$



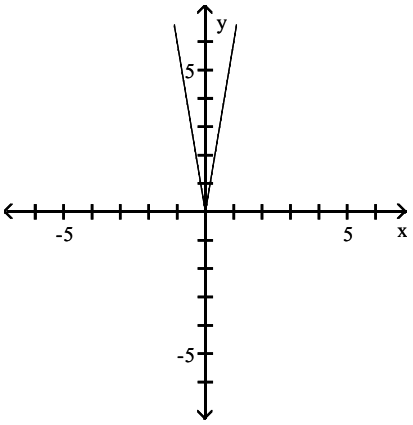
A)



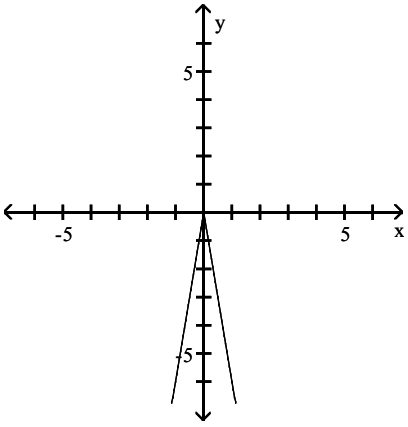
B)



C)



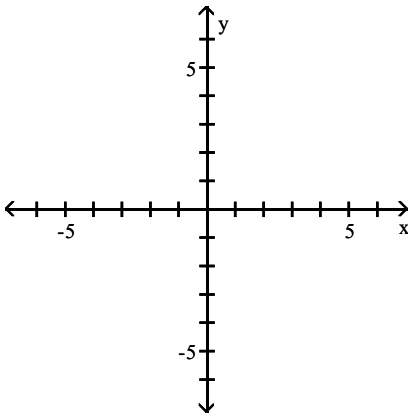
D)



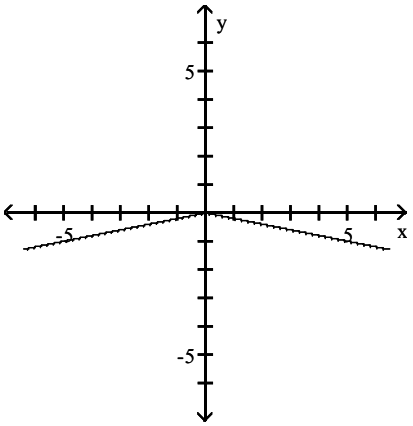
Answer: C

Access Complete Test Bank for Trigonometry 11th Sullivan

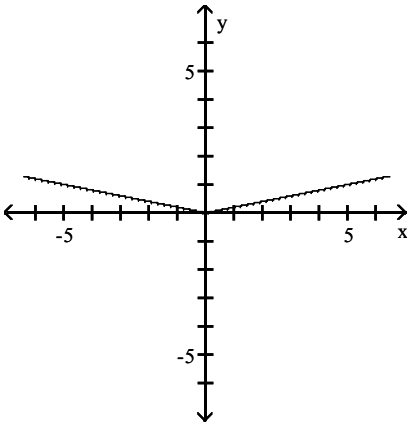
409) $f(x) = \frac{1}{5}|x|$



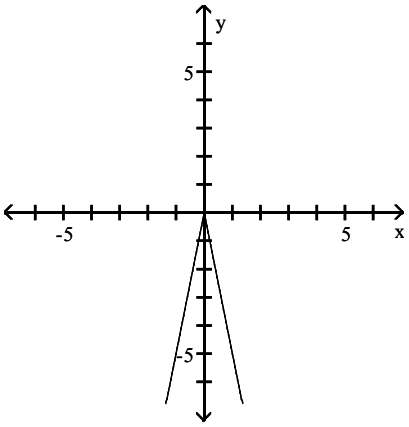
A)



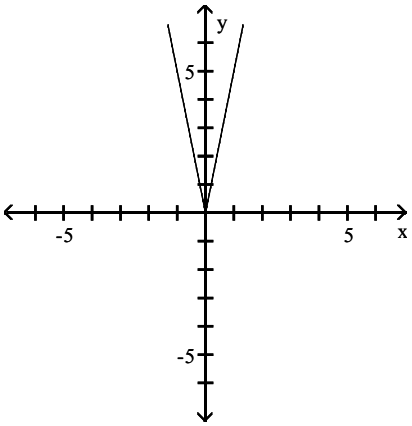
B)



C)



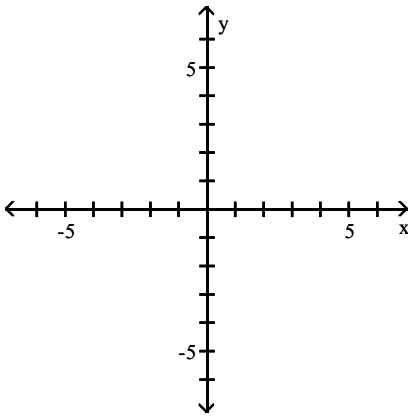
D)



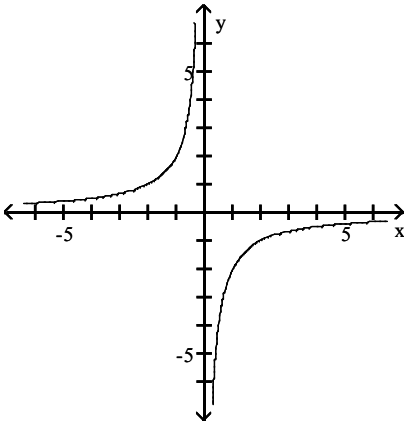
Answer: B

Access Complete Test Bank for Trigonometry 11th Sullivan

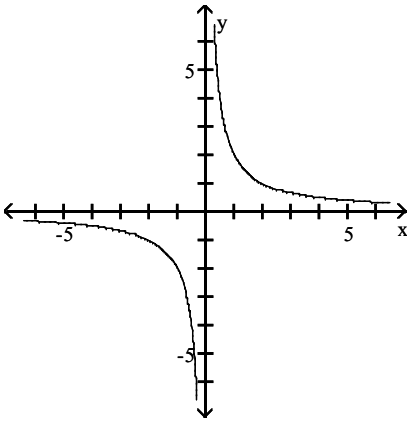
410) $f(x) = \frac{2}{x}$



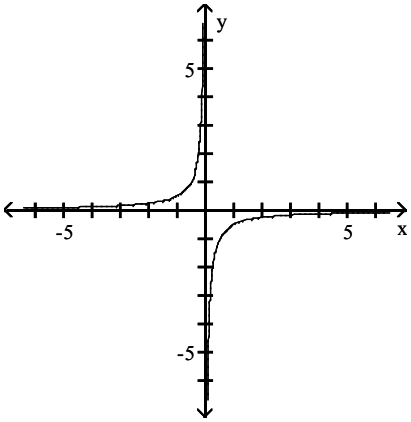
A)



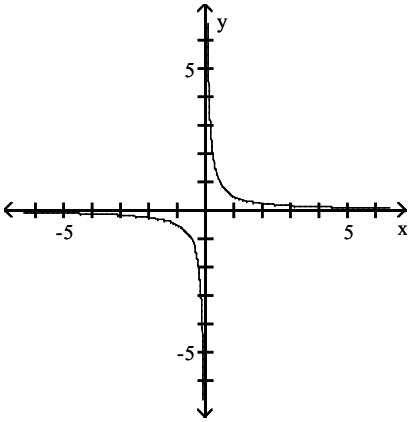
B)



C)



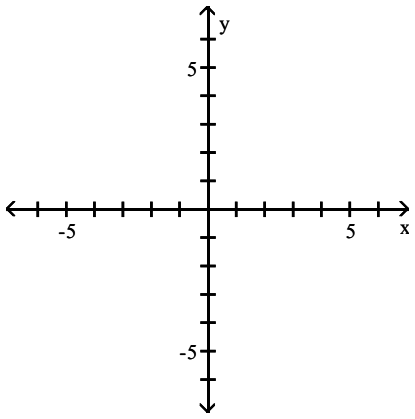
D)



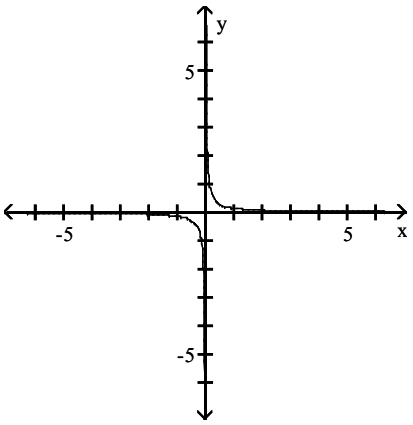
Answer: B

Access Complete Test Bank for Trigonometry 11th Sullivan

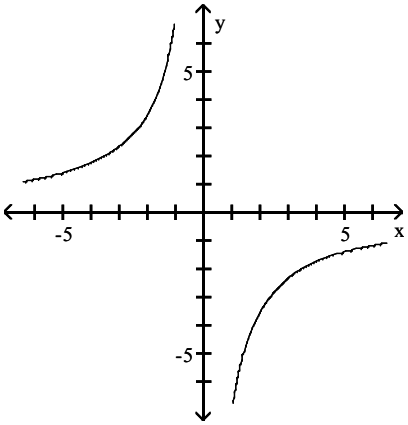
411) $f(x) = \frac{1}{7x}$



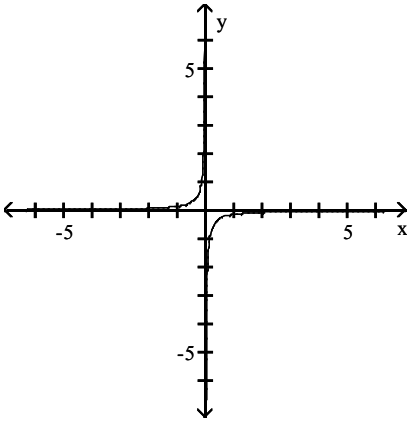
A)



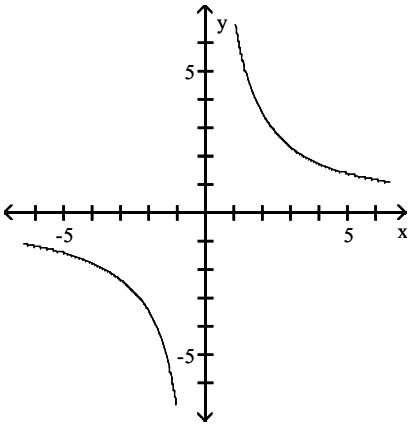
B)



C)



D)



Answer: A

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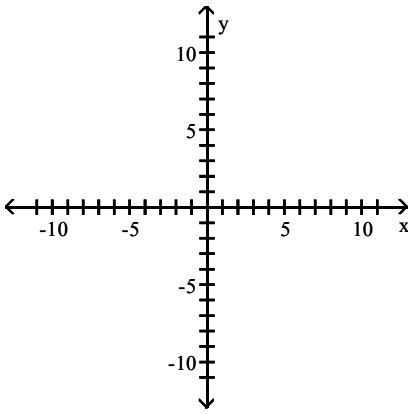
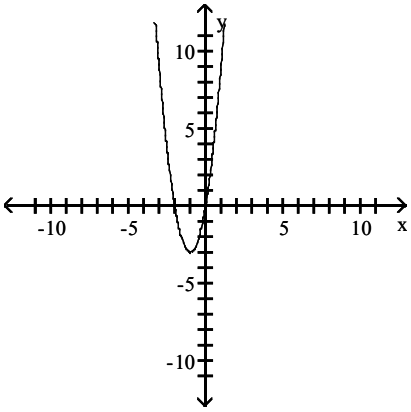
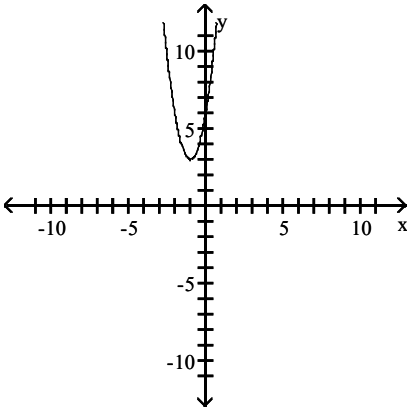
412) $f(x) = 3(x + 1)^2 + 3$



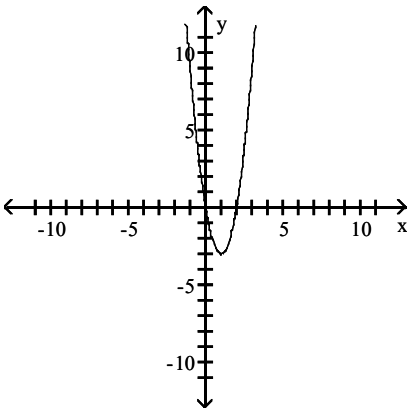
A)



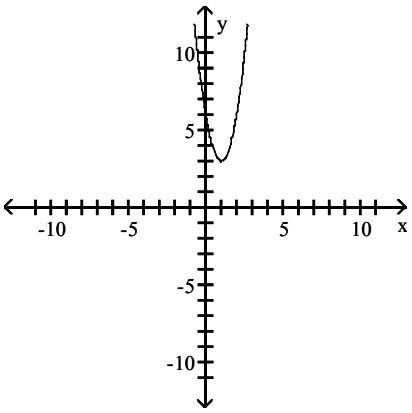
B)



C)



D)



Answer: B

Use the accompanying graph of y = f(x) to sketch the graph of the indicated equation.

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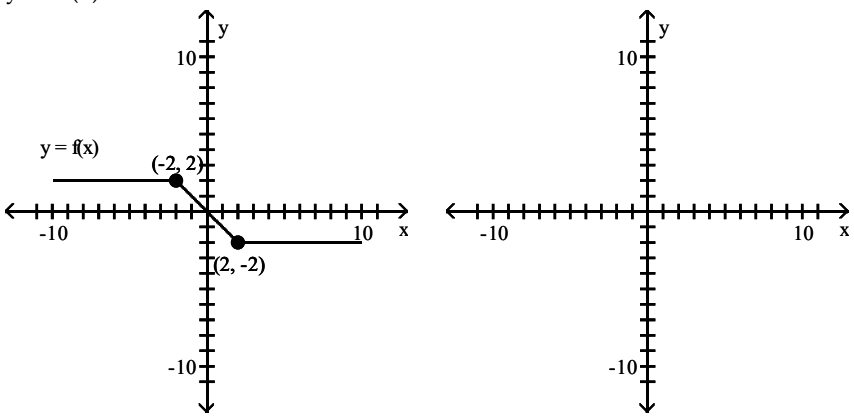
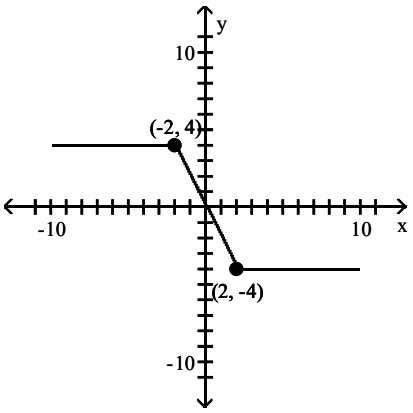
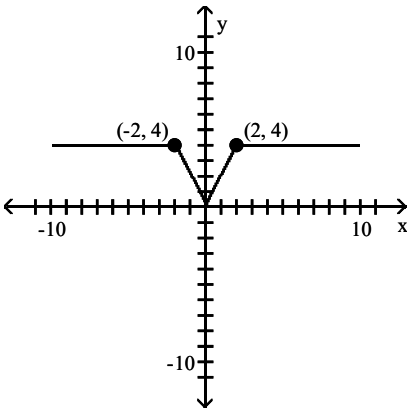
413) y = 2f(x)



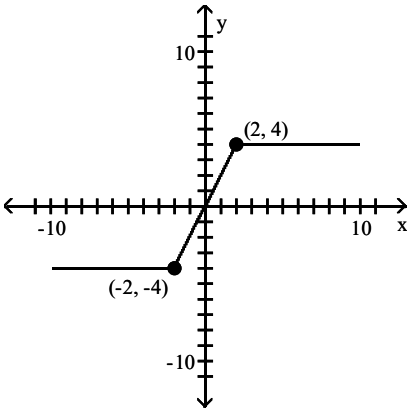
A)



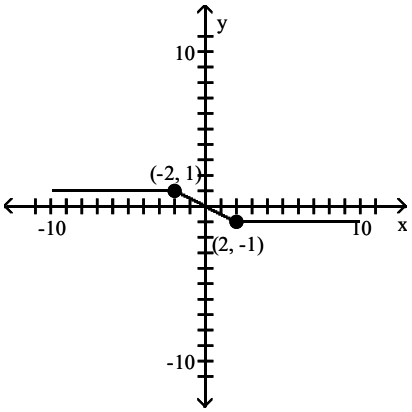
B)



C)



D)



Answer: A

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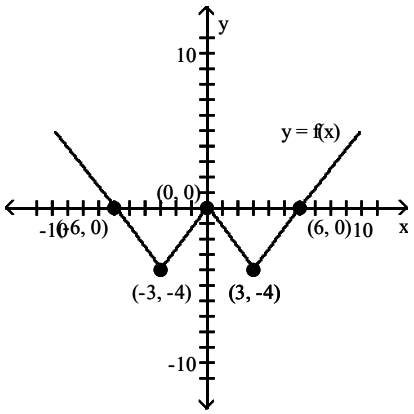
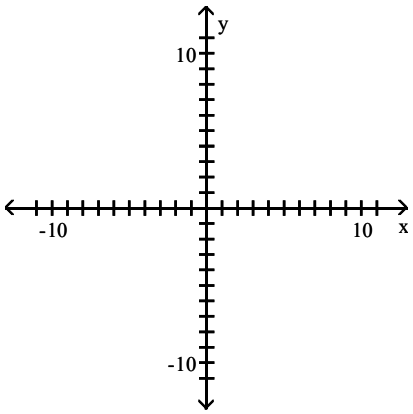
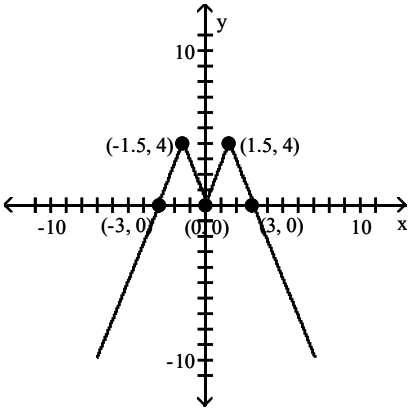
414) $y = -\frac{1}{2}f(x)$



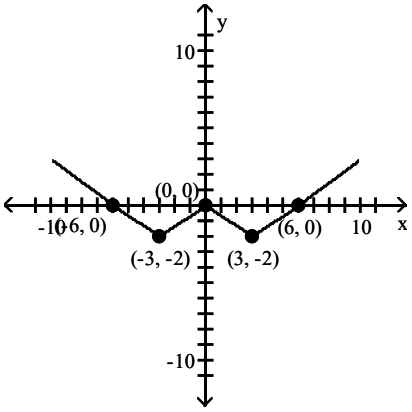
A)



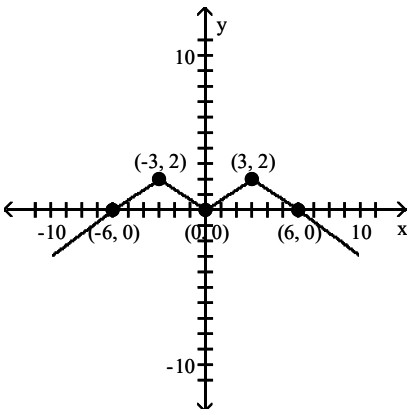
B)

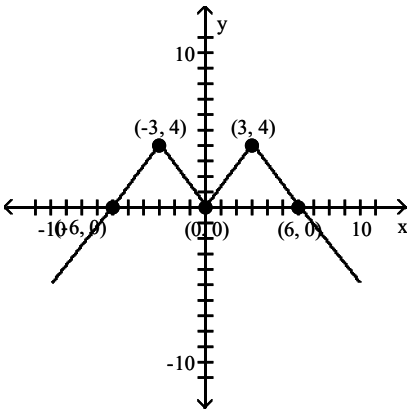


C)



D)





Answer: C

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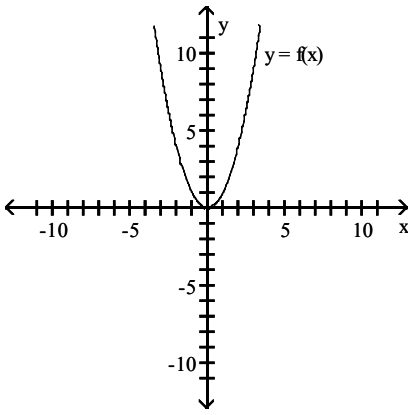
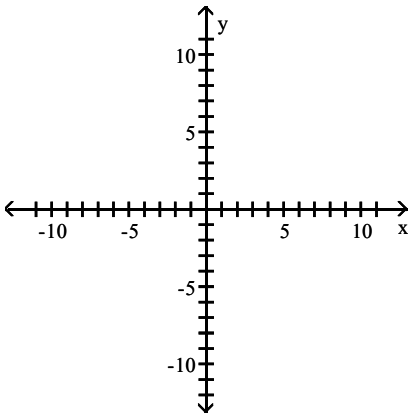
415) $y = -\frac{1}{4}f(x + 3) + 2$



A)



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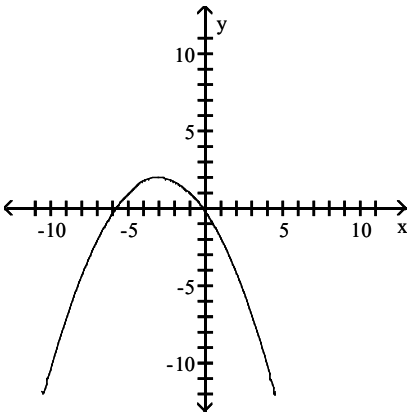

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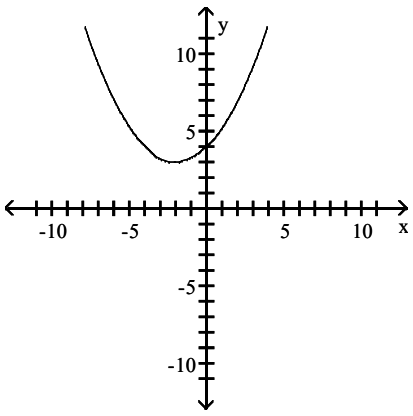
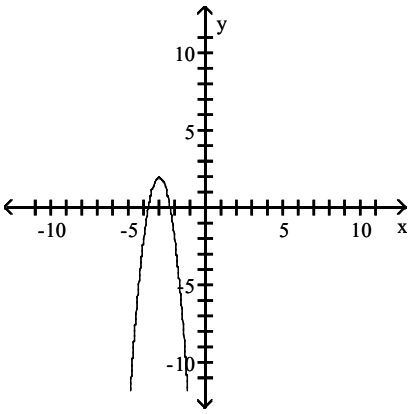


D)



Answer: A

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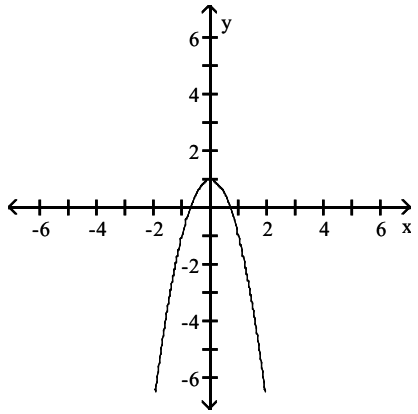
Match the correct function to the graph.

416)



A) $y = -2x^2$ B) $y = -2x^2 - 1$ C) $y = 1 - x^2$ D) $y = -2x^2 + 1$

Answer: D

Suppose the point (2, 4) is on the graph of y = f(x). Find a point on the graph of the given function.

417) The reflection of the graph of y = f(x) across the x–axis

A) (–2, –4) B) (2, –4) C) (2, 4) D) (–2, 4)

Answer: B

418) The reflection of the graph of y = f(x) across the y–axis

A) (2, 4) B) (–2, 4) C) (–2, –4) D) (2, –4)

Answer: B

Solve the problem.

419) Suppose that the x–intercepts of the graph of y = f(x) are 6 and 2. What are the x–intercepts of y = f(–x)?

A) 6 and –2 B) –6 and 2 C) –6 and –2 D) 6 and 2

Answer: C

420) Suppose that the function y = f(x) is decreasing on the interval (6, 3). What can be said about the graph of y = –f(x)?

A) increasing on (6, 3) B) increasing on (–6, –3)

C) decreasing on (6, 3) D) decreasing on (–6, –3)

Answer: A

Find the function.

421) Find the function that is finally graphed after the following transformations are applied to the graph of y = |x|. The graph is shifted right 3 units, stretched by a factor of 3, shifted vertically down 2 units, and finally reflected across the x–axis.

A) $y = -3|x - 3| - 2$ B) $y = 3|-x - 3| - 2$ C) $y = -(3|x + 3| - 2)$ D) $y = -(3|x - 3| - 2)$

Answer: D

422) Find the function that is finally graphed after the following transformations are applied to the graph of $y = \sqrt{x}$. The graph is shifted up 2 units, reflected about the y–axis, and finally shifted left 5 units.

A) $y = \sqrt{-x - 5} - 2$ B) $y = \sqrt{-x + 5} - 2$ C) $y = -\sqrt{x + 5} + 2$ D) $y = \sqrt{-x - 5} + 2$

Answer: D

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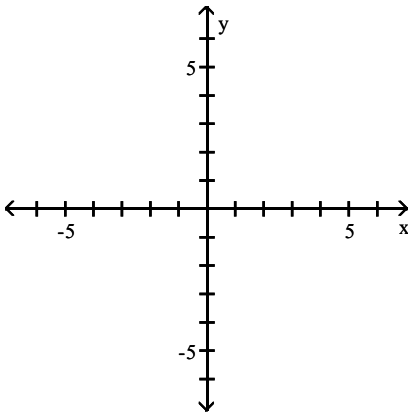
423) Find the function that is finally graphed after the following transformations are applied to the graph of $y = |x|$. The graph is shifted down 6 units, reflected about the x–axis, and finally shifted right 5 units.

A) $y = -|x + 5| + 6$ B) $y = |-x + 5| - 6$ C) $y = -|x - 5| + 6$ D) $y = -|x - 5| - 6$

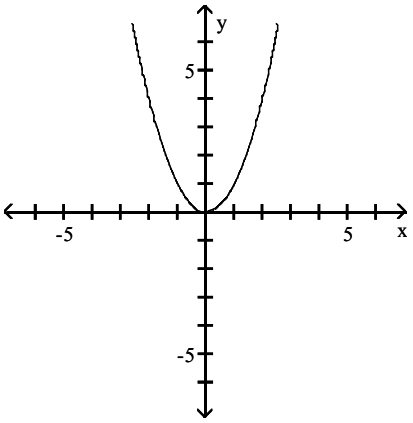
Answer: D

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

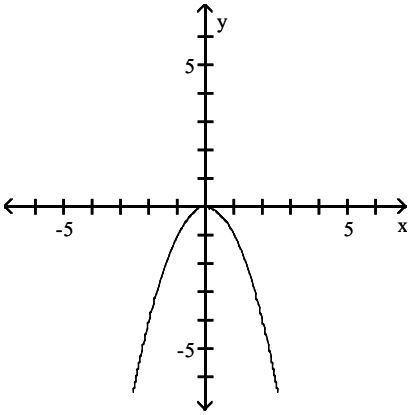
424) $f(x) = -x^2$



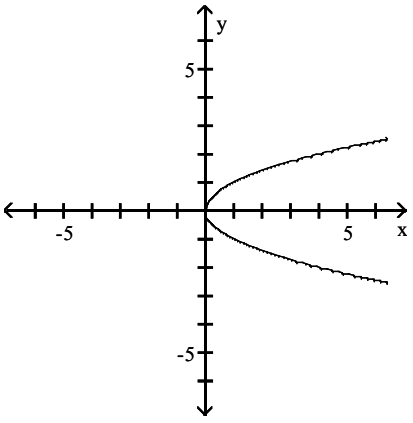
A)



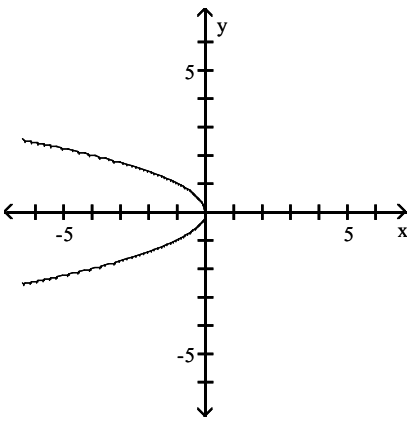
B)



C)



D)



Answer: B

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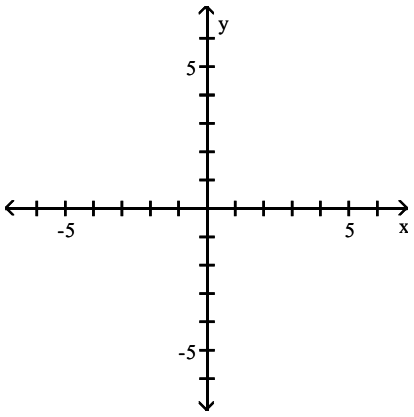
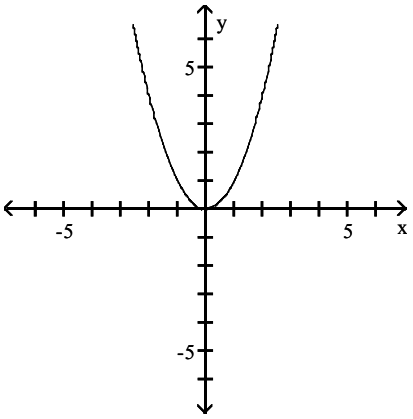
425) $f(x) = (-x)^2$



A)



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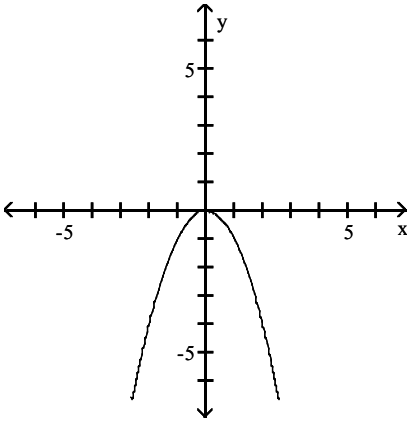

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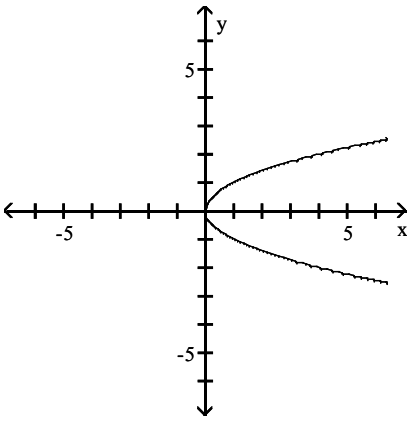

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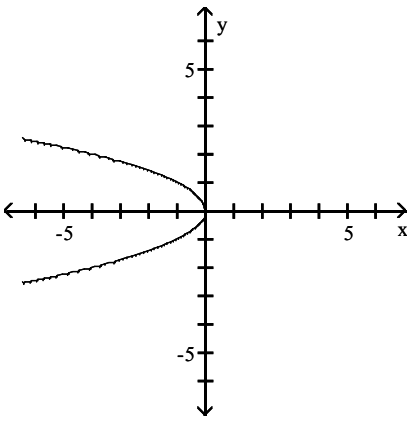

Answer: A

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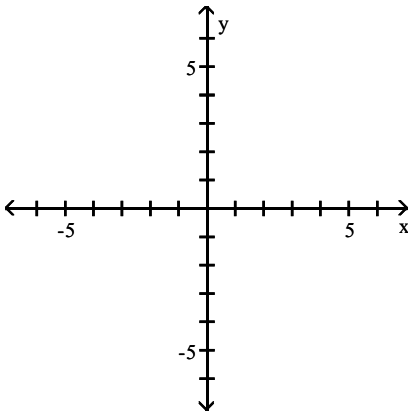
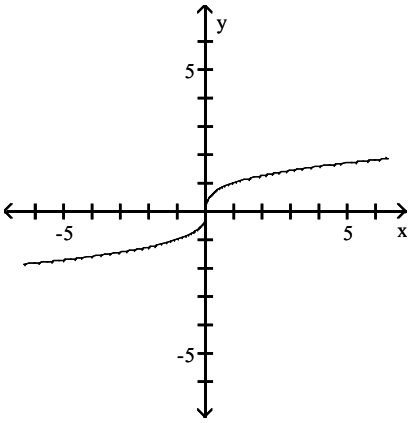
426) $f(x) = -x^3$



A)



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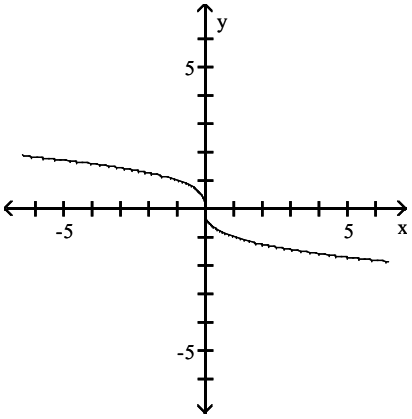

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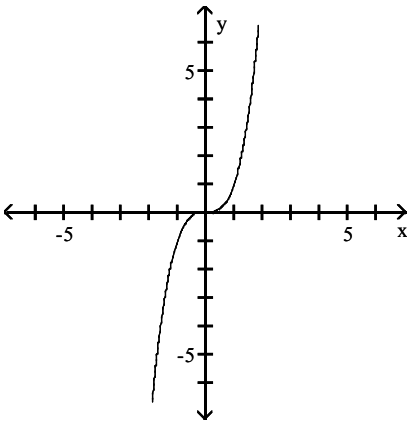
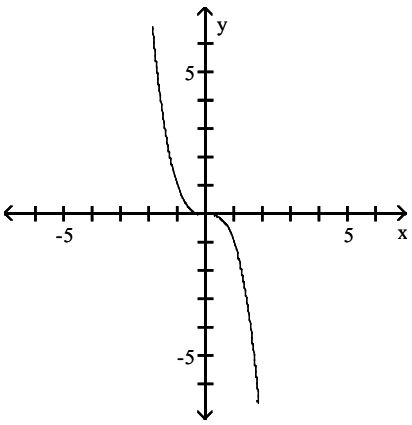


D)



Answer: D

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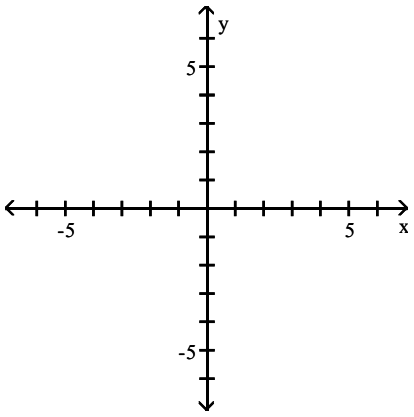
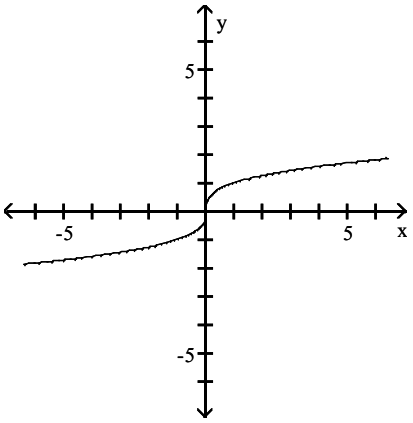
427) $f(x) = (-x)^3$



A)



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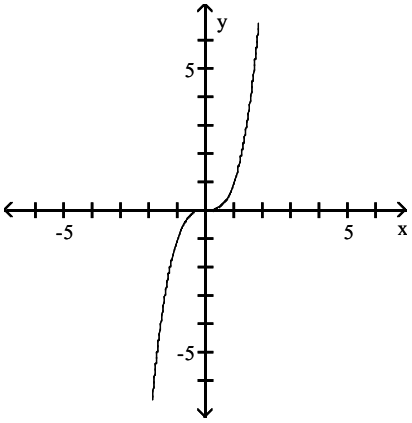

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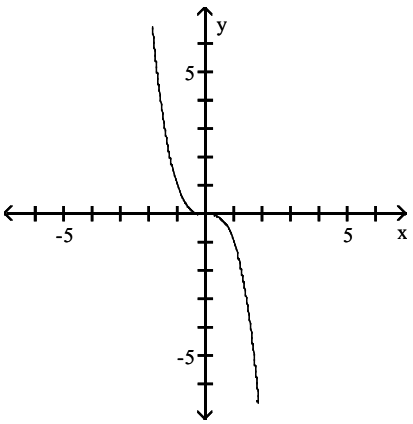

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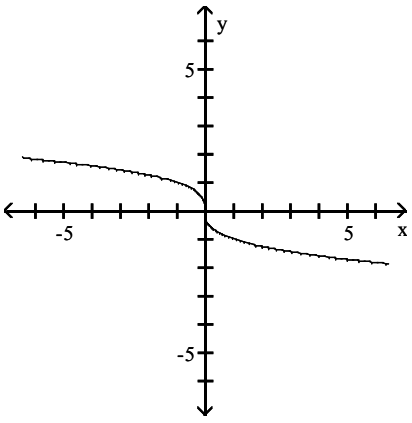

Answer: C

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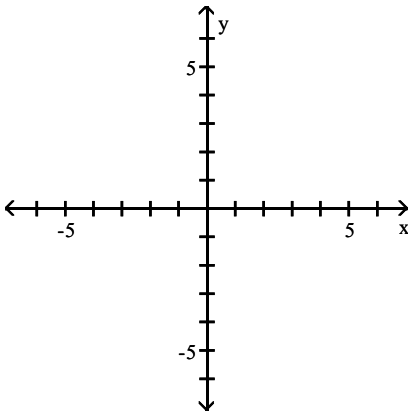
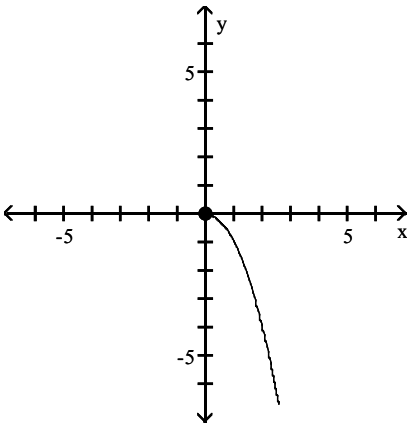
428) $f(x) = -\sqrt{x}$



A)



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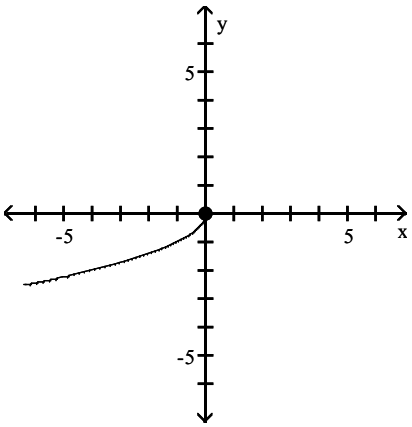
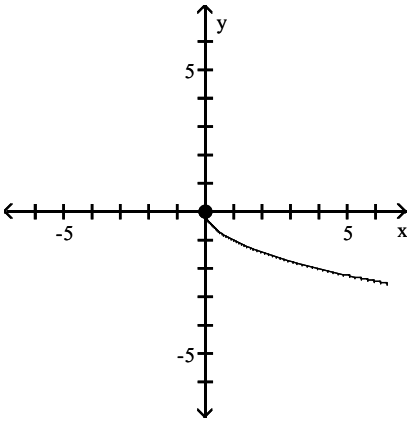
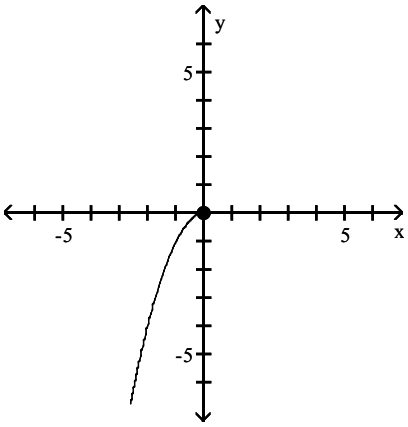


C)



D)



Answer: C

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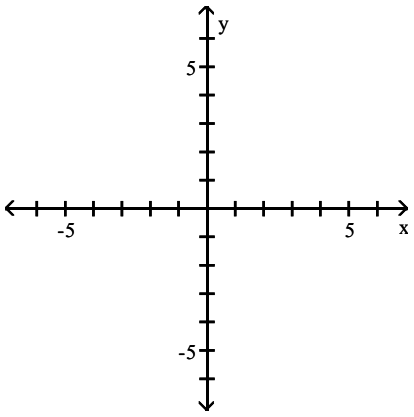
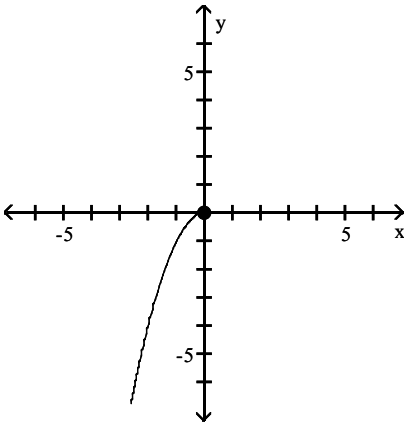
429) $f(x) = \sqrt{-x}$



A)



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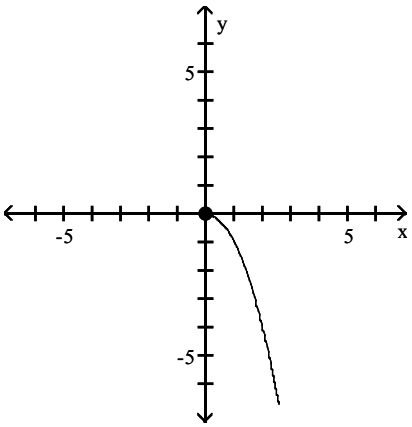
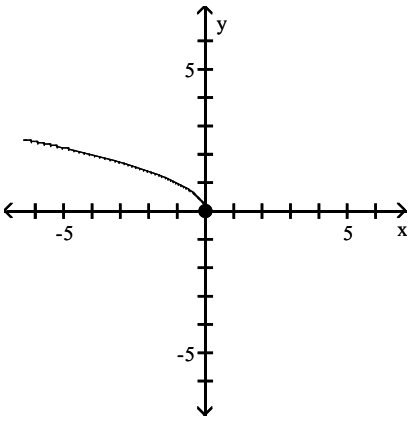
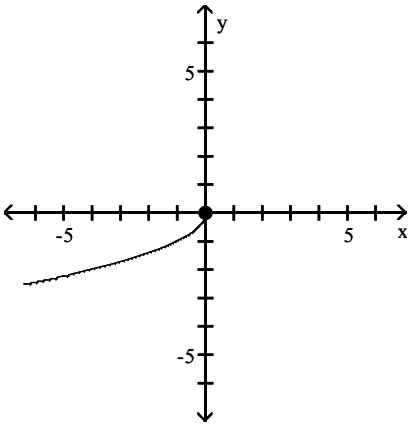


C)



D)



Answer: C

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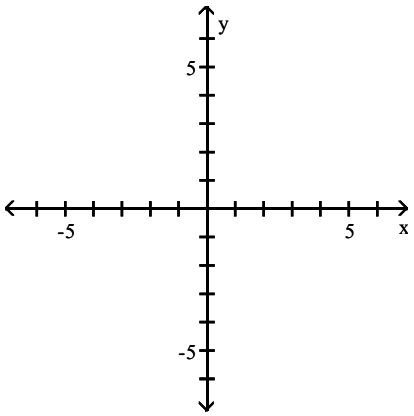
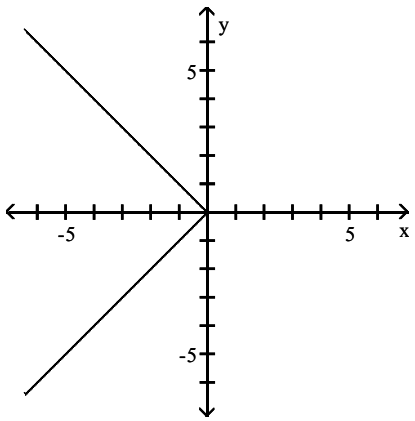
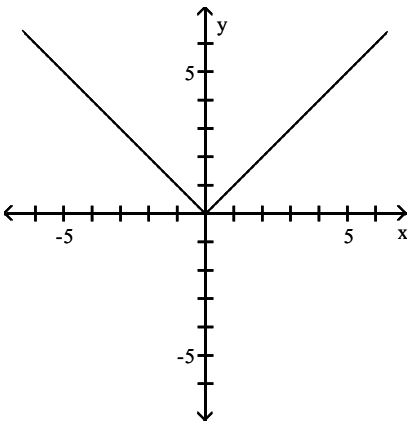
430) $f(x) = -|x|$



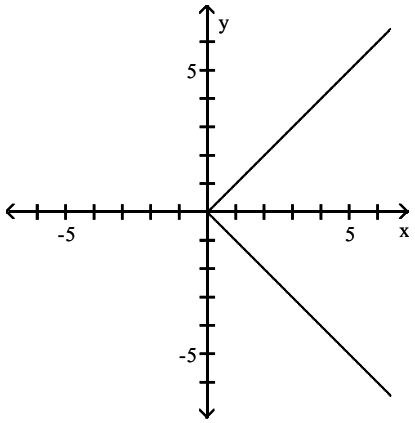
A)



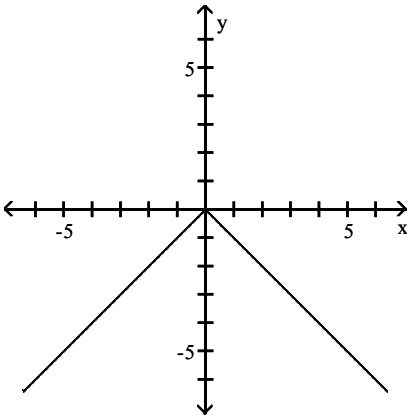
B)



C)



D)



Answer: D

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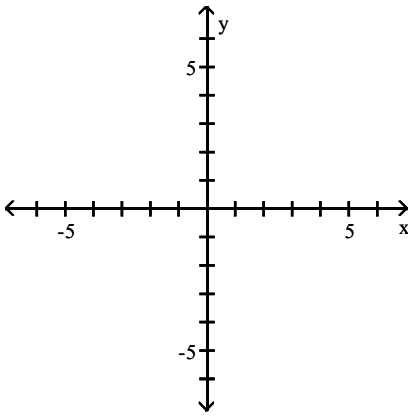
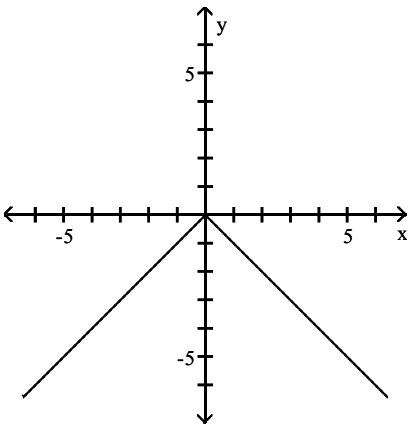
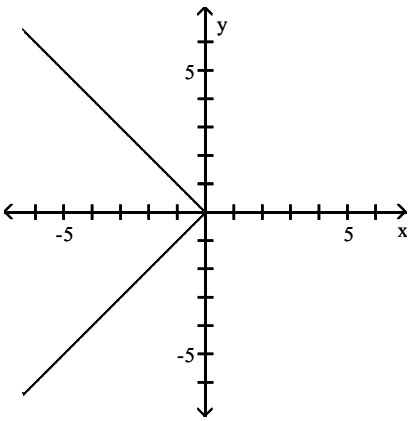
431) f(x) = |−x|



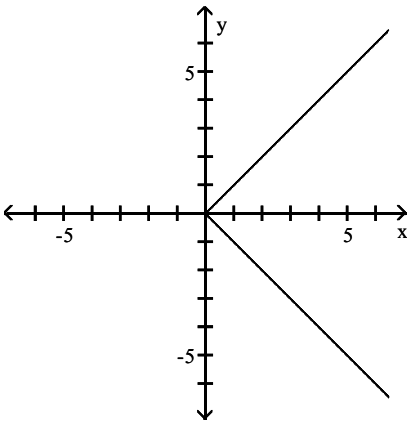
A)



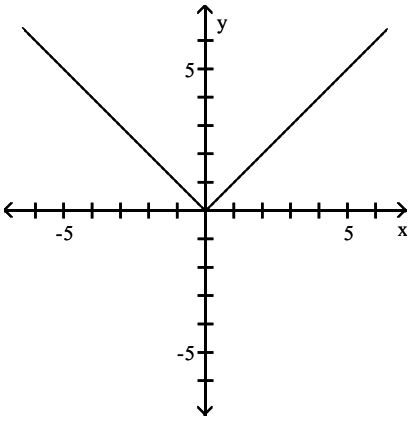
B)



C)



D)



Answer: D

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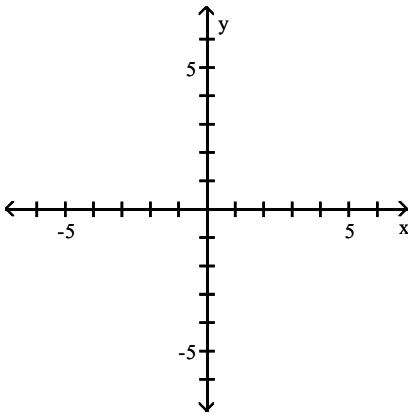
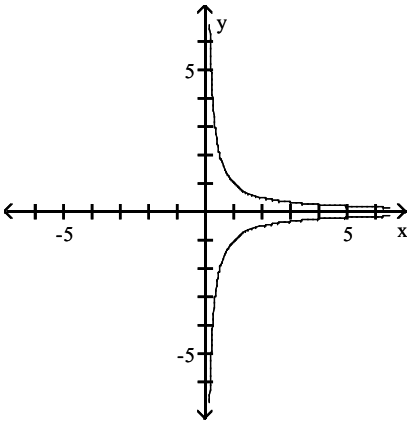
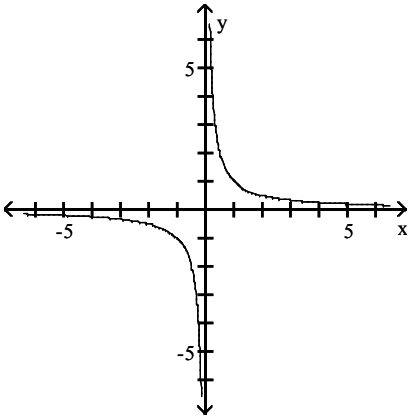
432) $f(x) = -\frac{1}{x}$



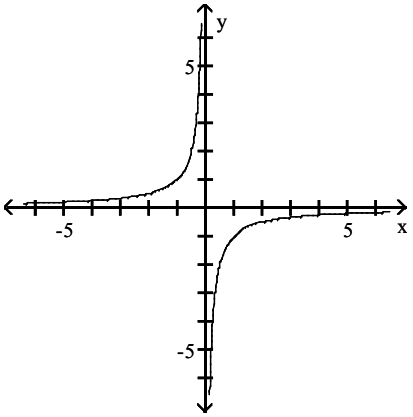
A)



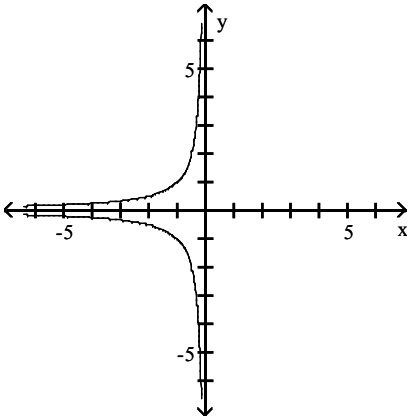
B)



C)



D)



Answer: C

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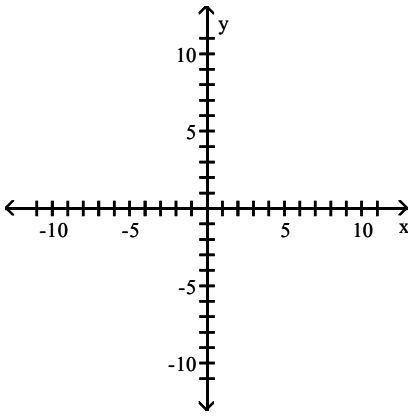
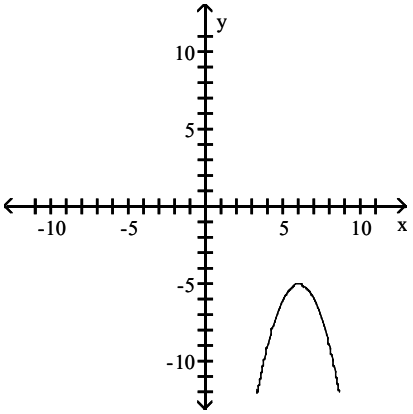
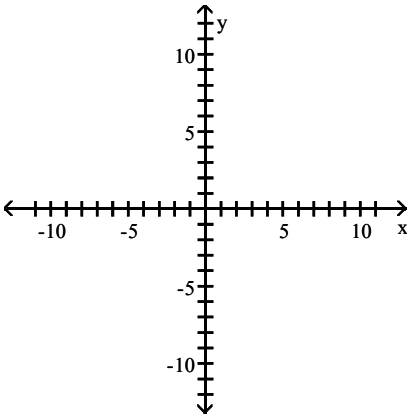
433) $f(x) = -(x - 6)^2 - 5$



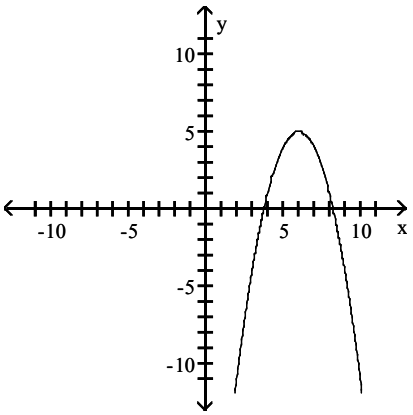
A)



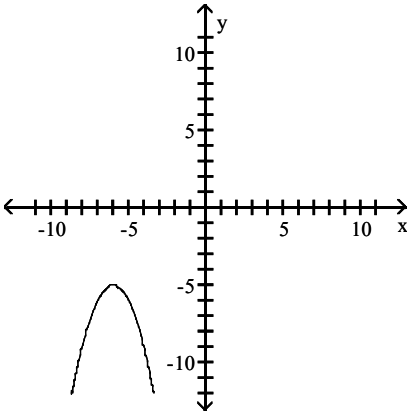
B)



C)



D)



Answer: A

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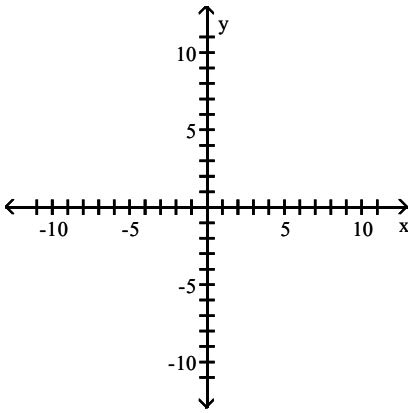
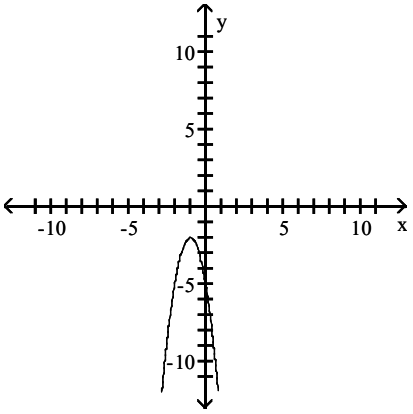
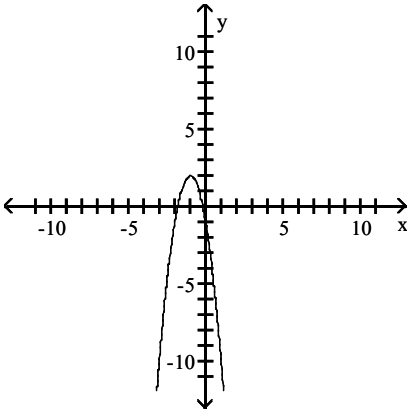
434) $f(x) = -3(x + 1)^2 + 2$



A)

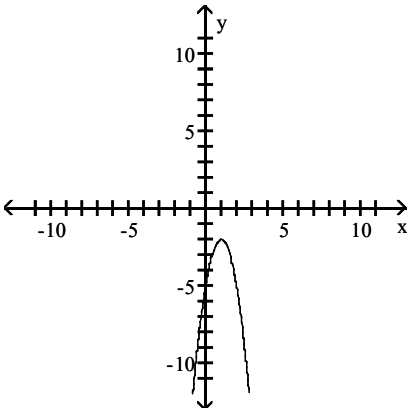
B)

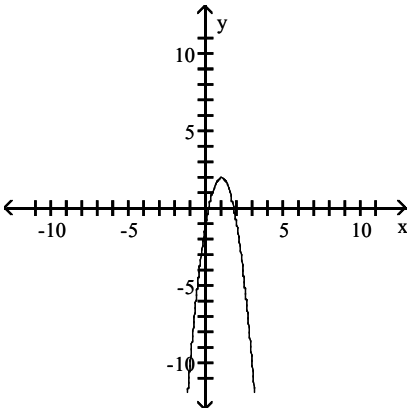




C)

D)





Answer: B

Indicate whether the function is one–to–one.

435) {(–19, –9), (2, 12), (11, –5)}

A) Yes

B) No

Answer: A

436) {(13, 4), (–1, 4), (16, 18)}

A) Yes

B) No

Answer: B

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437) {(2, –7), (3, –7), (4, –6), (5, 7)}

A) Yes B) No

Answer: B

438) {(6, –8), (11, –7), (9, –6), (7, –5)}

A) Yes B) No

Answer: A

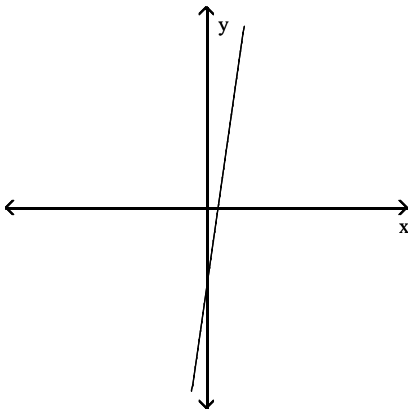
439) {(–5, –9), (9, 5), (–7, –1), (7, 1)}

A) Yes B) No

Answer: A

Use the horizontal line test to determine whether the function is one–to–one.

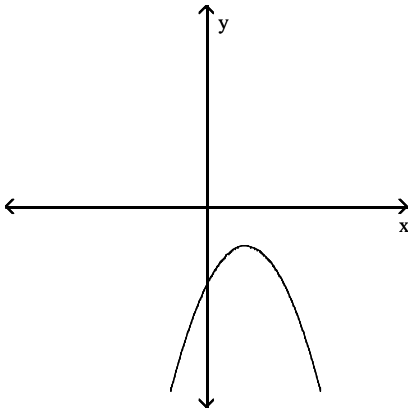
440)



A) Yes B) No

Answer: A

441)



A) Yes B) No

Answer: B

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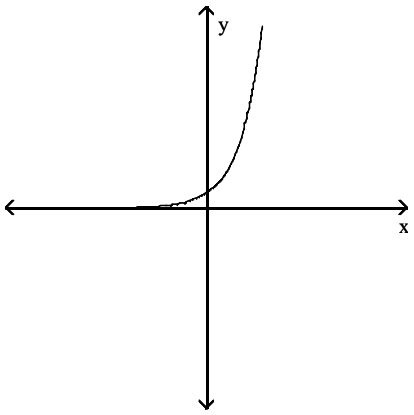
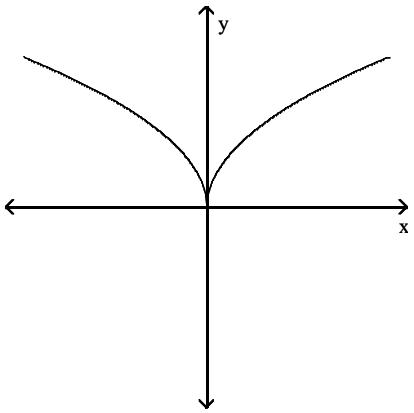
442)



A) Yes B) No

Answer: A

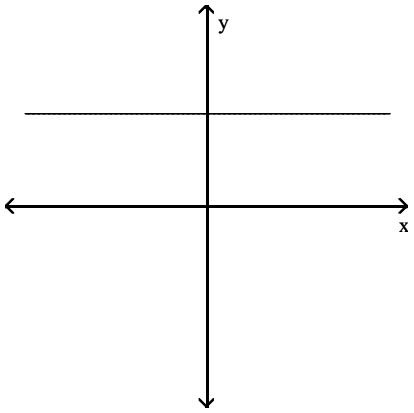
443)



A) Yes B) No

Answer: B

444)



A) Yes B) No

Answer: B

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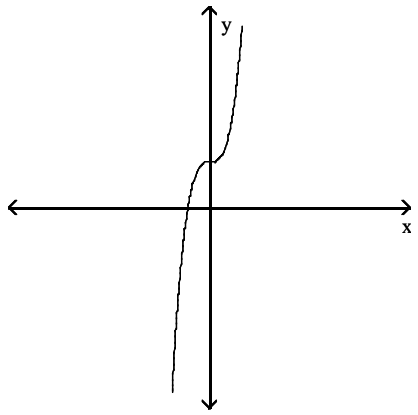
445)



A) Yes B) No

Answer: A

Find the inverse of the function and state its domain and range .

446) {(10, –6), (8, –5), (6, –4), (4, –3)}

A) $\left\{\left(10, -\frac{1}{6}\right), \left(8, -\frac{1}{5}\right), \left(6, -\frac{1}{4}\right), \left(4, -\frac{1}{3}\right)\right\}$; D = { 10, 8, 6, 4}, R = $\left\{-\frac{1}{6}, -\frac{1}{5}, -\frac{1}{4}, -\frac{1}{3}\right\}$

B) {(–5, –6), (–6, 6), (10, 8), (–5, –4)}; D = {(–5, –6, 10}; R = {(–6, 6 8, –4}

C) {(–5, –6), (–3, 6), (10, 6), (–5, –4)}; D = {–5, –3, 10}; R = {–6, 6, –4}

D) {(–6, 10), (–5, 8), (–4, 6), (–3, 4)}; D = {–6, –5, –4, –3 }; R = {10, 8, 6, 4}

Answer: D

447) {(–2, 6), (–6, 2), (7, 8), (–7, –8)}

A) $\left\{\left(-2, \frac{1}{6}\right), \left(-6, \frac{1}{2}\right), \left(7, \frac{1}{8}\right), \left(-7, -\frac{1}{8}\right)\right\}$, D = { –2, –6, 7, –7}, R = $\left\{\frac{1}{6}, \frac{1}{2}, \frac{1}{8}, -\frac{1}{8}\right\}$

B) {(–8, 7), (7, –6), (6, –2), (8, –7)}; D = {–8, 7, 6, 8}; R = {7, –6, –2, –7}

C) {(6, –2), (2, –6), (8, 7), (–8, –7)} D = {6, 2, 8, –8}; R = {–2, –6, 7, –7}

D) {(–8, 7), (2, –6), (6, –6), (8, –7)}; D = {(–8, 2, 6, 8}; R = {7, –6, –7}

Answer: C

448) {(–3, 4), (–1, 5), (0, 2), (2, 6), (5, 7)}

A) {(4, –3), (5, –1), (2, 0), (6, 2), (7, 5)} D = {2, 4, 5, 6, 7}; R = {–3, –1, 0, 2, 5}

B) {(3, –4), (1, –5), (0, –2), (–2, –6), (–5, –7)}; D = {3, 1, 0, –2, –5}; R = {–7, –6, –5, –4, –2}

C) {(3, 4), (1, 5), (0, 2), (–2, 6), (–5, 7)}; D = {3, 1, 0, –2, –5}; R = {2, 4, 5, 6, 7}

D) {(–3, –4), (–1, –5), (0, –2), (2, –6), (5, –7)}; D = {–3, –1, 0, 2, 5}; R = {–7, –6, –5, –4, –2}

Answer: A

Find the inverse. Determine whether the inverse represents a function.

449) {(6, 1), (–5, 2), (–7, 3), (–9, 4)}

A) {(2, 1), (1, –7), (6, –5), (2, 3)}; not a function B) {(1, 6), (2, –5), (3, –7), (4, –9)}; a function

C) {(2, 1), (4, –7), (6, –7), (2, 3)}; a function D) {(1, 6), (2, –5), (3, –7), (4, –9)}; not a function

Answer: B

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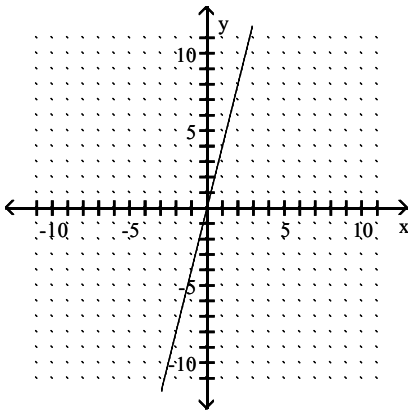
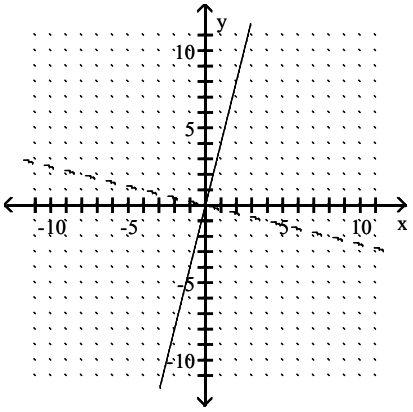
The graph of a one-to-one function f is given. Draw the graph of the inverse function f^{-1} as a dashed line or curve.

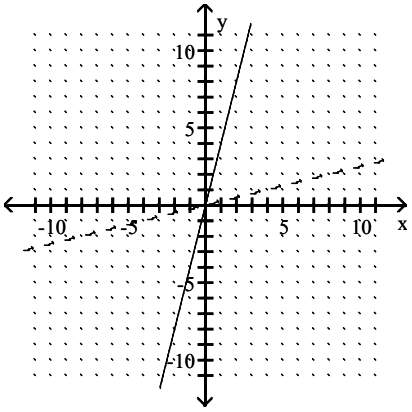
450) f(x) = 4x



A)



B)



Answer: B

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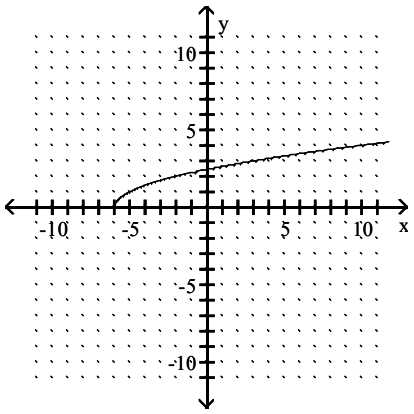
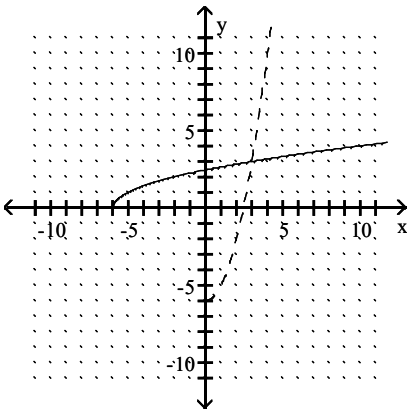
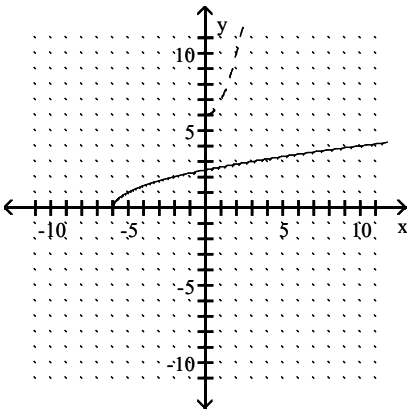
451) $f(x) = \sqrt{x + 6}$



A)



B)



Answer: A

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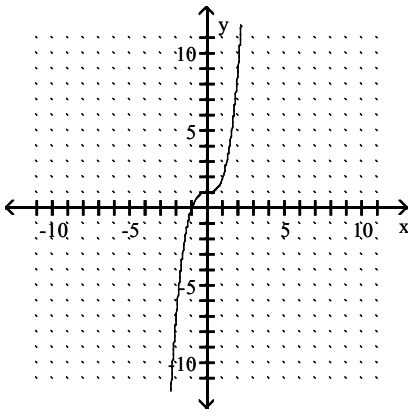
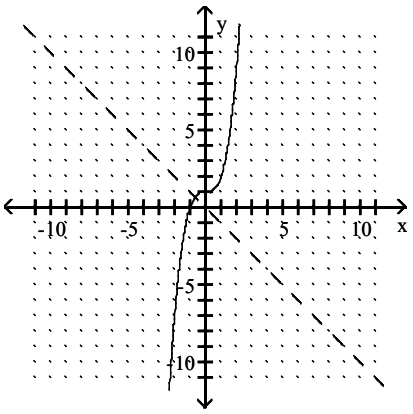
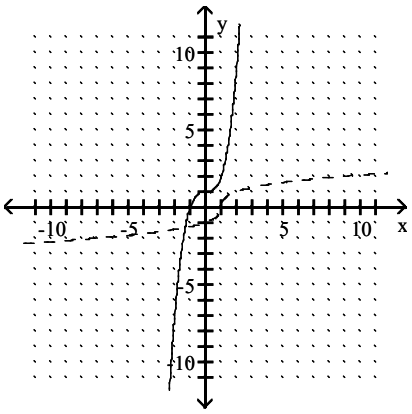
452) $f(x) = x^3 + 1$



A)



B)



Answer: B

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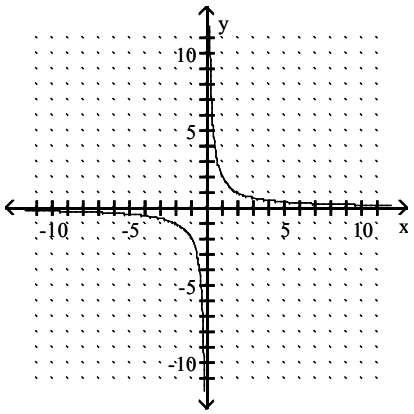
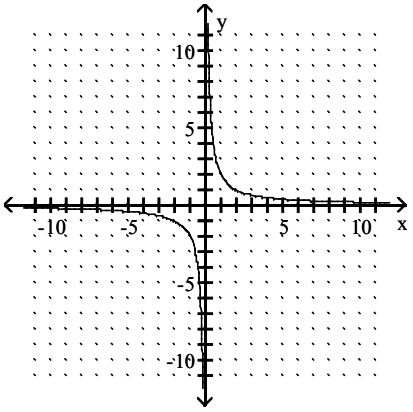
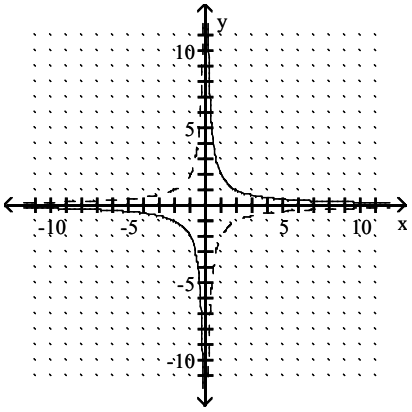
453) $f(x) = \frac{2}{x}$



A) Function is its own inverse

B)

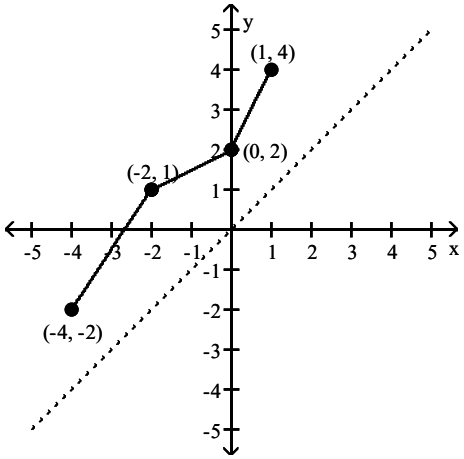




Answer: A

Use the graph of the given one–to–one function to sketch the graph of the inverse function. For convenience, the graph of y = x is also given.

454)



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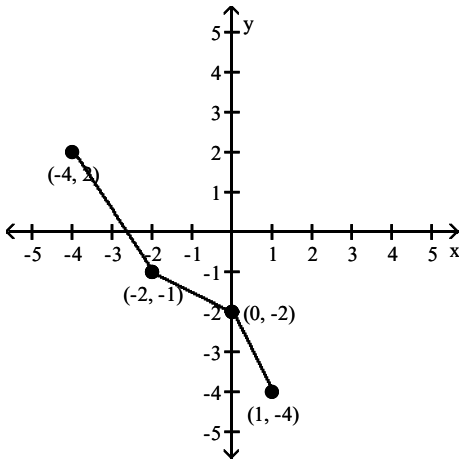
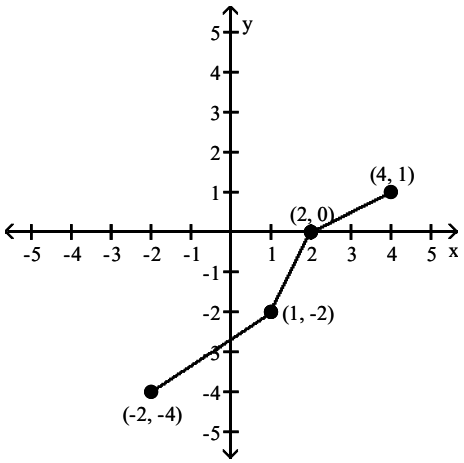
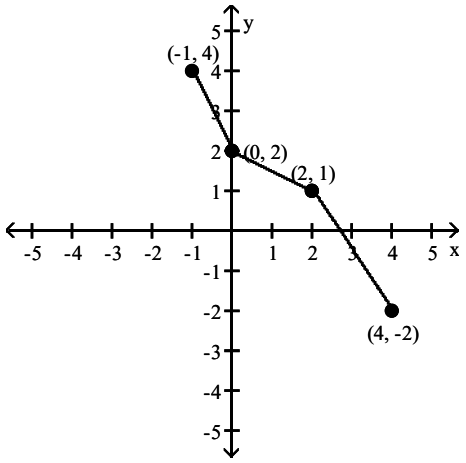
A)



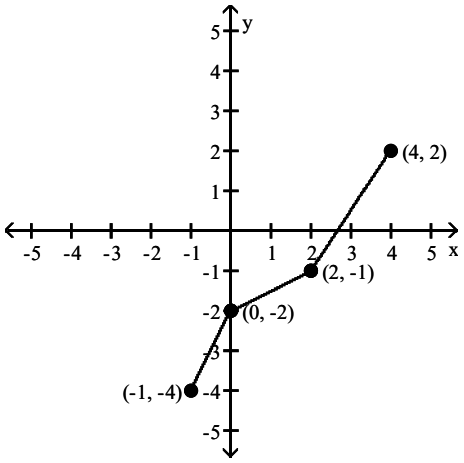
B)



C)



D)



Answer: B

Decide whether or not the functions are inverses of each other.

455) $f(x) = 9x - 4,\ g(x) = \dfrac{x + 9}{4}$

A) Yes B) No

Answer: B

456) $f(x) = 4x + 16,\ g(x) = \dfrac{1}{4}x - 4$

A) Yes B) No

Answer: A

457) $f(x) = 8x - 8,\ g(x) = \dfrac{1}{8}x + 1$

A) No B) Yes

Answer: B

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458) $f(x) = 2x^2 + 1,\ g(x) = \sqrt{\frac{x-1}{2}}$

A) Yes; Exclude the interval $(-\infty, 2)$
B) Yes; No values need to be excluded.
C) No
D) Yes; Exclude the interval $(-\infty, 1)$

Answer: D

459) $f(x) = (x-3)^2,\ x \geq 3;\ g(x) = \sqrt{x} + 3$

A) Yes
B) No

Answer: A

460) $f(x) = (x-6)^2,\ x \geq 6;\ g(x) = \sqrt{x+6}$

A) Yes
B) No

Answer: B

461) $f(x) = \frac{4}{x+6},\ g(x) = \frac{6x+4}{x}$

A) Yes
B) Yes; Exclude the value $\{-6\}$
C) No

Answer: C

462) $f(x) = \frac{8+x}{x},\ g(x) = \frac{8}{x-1}$

A) No
B) Yes

Answer: B

463) $f(x) = \sqrt{x+7}$, domain $[-7, \infty)$; $g(x) = x^2 + 7$, domain $(-\infty, \infty)$

A) Yes
B) No

Answer: B

464) $f(x) = x^3 - 7,\ g(x) = \sqrt[3]{x+7}$

A) Yes
B) No

Answer: A

The function f is one–to–one. Find its inverse.

465) $f(x) = 8x$

A) $f^{-1}(x) = -8x$
B) $f^{-1}(x) = \frac{8}{x}$
C) $f^{-1}(x) = \frac{x}{8}$
D) $f^{-1}(x) = 8x$

Answer: C

466) $f(x) = 5x + 7$

A) $f^{-1}(x) = -\frac{x+5}{7}$
B) $f^{-1}(x) = \frac{x-7}{5}$
C) $f^{-1}(x) = \frac{x+7}{5}$
D) $f(x) = \frac{x-7}{5}$

Answer: B

467) $f(x) = 4x - 7$

A) $f^{-1}(x) = \frac{x}{4} - 7$
B) $f^{-1}(x) = \frac{x-7}{4}$
C) $f^{-1}(x) = \frac{x}{4} + 7$
D) $f^{-1}(x) = \frac{x+7}{4}$

Answer: D

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468) $f(x) = \frac{8}{x}$

A) $f^{-1}(x) = -8x$ B) $f^{-1}(x) = \frac{x}{8}$ C) $f^{-1}(x) = \frac{8}{x}$ D) $f^{-1}(x) = 8x$

Answer: C

469) $f(x) = x^2 + 3, x \geq 0$

A) $f^{-1}(x) = \sqrt{x - 3}, x \geq 0$ B) $f^{-1}(x) = \sqrt{x - 3}, x \geq 3$

C) $f^{-1}(x) = \sqrt{x + 3}, x \geq -3$ D) $f^{-1}(x) = \sqrt{x} - 3, x < 0$

Answer: B

470) $f(x) = 7x^2 + 7, x \geq 0$

A) $f^{-1}(x) = \sqrt{\frac{7}{x - 7}}$ B) $f^{-1}(x) = \frac{7}{\sqrt{x - 7}}$ C) $f^{-1}(x) = \sqrt{\frac{x - 7}{7}}$ D) $f^{-1}(x) = -\sqrt{\frac{x - 7}{7}}$

Answer: C

471) $f(x) = x^3 - 6$

A) $f^{-1}(x) = \sqrt[3]{x + 6}$ B) $f^{-1}(x) = \sqrt[3]{x - 6}$ C) $f^{-1}(x) = \sqrt[3]{x} - 6$ D) $f^{-1}(x) = \sqrt[3]{x + 6}$

Answer: D

472) $f(x) = \frac{3x - 4}{5}$

A) $f^{-1}(x) = \frac{5x + 4}{3}$ B) $f^{-1}(x) = \frac{5x - 4}{3}$ C) $f^{-1}(x) = \frac{5}{3x - 4}$ D) $f^{-1}(x) = \frac{5}{3x + 4}$

Answer: A

473) $f(x) = \frac{3}{4x + 5}$

A) $f^{-1}(x) = \frac{5x - 3}{4x}$ B) $f^{-1}(x) = \frac{3 - 5y}{4y}$ C) $f^{-1}(x) = \frac{4x + 5}{3}$ D) $f^{-1}(x) = \frac{3 - 5x}{4x}$

Answer: D

474) $f(x) = \frac{3}{x - 3}$

A) $f^{-1}(x) = \frac{-3 + 3x^2}{x}$ B) $f^{-1}(x) = \frac{3x + 3}{x}$ C) $f^{-1}(x) = \frac{x}{-3 + 3x}$ D) $f^{-1}(x) = \frac{-3 + 3x}{x}$

Answer: B

475) $f(x) = (x - 5)^3$

A) $f^{-1}(x) = \sqrt[3]{x} - 5$ B) $f^{-1}(x) = \sqrt[3]{x} + 125$ C) $f^{-1}(x) = \sqrt{x} + 5$ D) $f^{-1}(x) = \sqrt[3]{x} + 5$

Answer: D

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476) $f(x) = (x + 2)^3 - 8$.

A) $f^{-1}(x) = \sqrt[3]{x - 2} + 8$ B) $f^{-1}(x) = \sqrt[3]{x + 10}$ C) $f^{-1}(x) = \sqrt[3]{x + 6}$ D) $f^{-1}(x) = \sqrt[3]{x + 8} - 2$

Answer: D

477) $f(x) = \sqrt{x - 3}$

A) $f^{-1}(x) = x^2 + 3, x \geq 0$ B) $f^{-1}(x) = \sqrt{x + 3}$

C) $f^{-1}(x) = x^2 - 3, \ x \geq 0$ D) $f^{-1}(x) = (x - 3)^2$

Answer: A

478) $f(x) = \sqrt[3]{x + 3}$

A) $f^{-1}(x) = x^3 - 3$ B) $f^{-1}(x) = x^3 + 9$ C) $f^{-1}(x) = \dfrac{1}{x^3 - 3}$ D) $f^{-1}(x) = x - 3$

Answer: A

479) $f(x) = \dfrac{-3x + 9}{8x - 4}$

A) $f^{-1}(x) = \dfrac{4x + 9}{8x + 3}$ B) $f^{-1}(x) = \dfrac{8x + 3}{4x + 9}$ C) $f^{-1}(x) = \dfrac{-3x - 3}{8x - 4}$ D) $f^{-1}(x) = \dfrac{-3x + 9}{8x - 4}$

Answer: A

Find the inverse function of f. State the domain and range of f.

480) $f(x) = \dfrac{3x - 2}{x + 5}$

A) $f^{-1}(x) = \dfrac{5x + 2}{3 + x}$; domain of f: $\{x \mid x \neq -5\}$; range of f: $\{y \mid y \neq -3\}$

B) $f^{-1}(x) = \dfrac{x + 5}{3x - 2}$; domain of f: $\{x \mid x \neq -5\}$; range of f: $\{y \mid y \neq \dfrac{2}{3}\}$

C) $f^{-1}(x) = \dfrac{5x + 2}{3 - x}$; domain of f: $\{x \mid x \neq -5\}$; range of f: $\{y \mid y \neq 3\}$

D) $f^{-1}(x) = \dfrac{3x + 2}{x - 5}$; domain of f: $\{x \mid x \neq -5\}$; range of f: $\{y \mid y \neq 5\}$

Answer: C

Determine i) the domain of the function, ii) the range of the function, iii) the domain of the inverse, and iv) the range of the inverse.

481) $f(x) = -3x - 4$

A) f(x): D = $\{x \mid x > -3\}$, R = $\{y \mid y > -4\}$;
$f^{-1}(x)$: D = $\{x \mid x < -3\}$, R = $\{y \mid y < -4\}$

B) f(x): D is all real numbers, R = $\{y \mid y > -4\}$;
$f^{-1}(x)$: D is all real numbers, R = $\{y \mid y < -4\}$

C) f(x): D is all real numbers, R is all real numbers;
$f^{-1}(x)$: D is all real numbers, R is all real numbers

D) f(x): D = $\{x \mid x > -3\}$, R is all real numbers;
$f^{-1}(x)$: D = $\{x \mid x < -3\}$, R is all real numbers

Answer: C

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482) $f(x) = \dfrac{4}{x + 3}$

A) f(x): D = {x | x ≠ –3}, R = {y ≠ 0};
$f^{-1}(x)$: D = {x | x ≠ 0}, R = {y | y ≠ –3}

B) f(x): $D = \left\{x \mid x \neq \frac{4}{3}\right\}$, $R = \{y \mid y \neq -3\}$;
$f^{-1}(x)$: $D = \{x \mid x \neq -3\}$, $R = \left\{y \mid y \neq \frac{4}{3}\right\}$

C) f(x): D is all real numbers, $R = \left\{y \mid y \neq \frac{4}{3}\right\}$;
$f^{-1}(x)$: $D = \left\{x \mid x \neq \frac{4}{3}\right\}$, R is all real numbers

D) f(x): D is all real numbers, R is all real numbers;
$f^{-1}(x)$: D is all real numbers, R is all real numbers

Answer: A

483) $f(x) = \dfrac{3}{7x + 5}$

A) f(x): D is all real numbers, R is all real numbers;
$f^{-1}(x)$: D is all real numbers, R is all real numbers

B) f(x): $D = \left\{x \mid x \neq \frac{5}{7}\right\}$, $R = \{y \mid y \neq -5\}$;
$f^{-1}(x)$: $D = \{x \mid x \neq -5\}$, $R = \left\{y \mid y \neq \frac{5}{7}\right\}$

C) f(x): $D = \left\{x \mid x \neq -\frac{5}{7}\right\}$, $R = \{y \mid y \neq 0\}$;
$f^{-1}(x)$: $D = \{x \mid x \neq 0\}$, $R = \left\{y \mid y \neq -\frac{5}{7}\right\}$

D) f(x): $D = \left\{x \mid x \neq \frac{3}{7}\right\}$, $R = \left\{y \mid y \neq \frac{3}{5}\right\}$;
$f^{-1}(x)$: $D = \left\{x \mid x \neq \frac{3}{5}\right\}$, $R = \left\{y \mid y \neq \frac{3}{7}\right\}$

Answer: C

484) $f(x) = \sqrt{5x - 6}$

A) f(x): $D = \{x \mid x \geq 0\}$, $R = \{y \mid y \geq 0\}$;
$f^{-1}(x)$: $D = \{x \mid x \geq 0\}$, $R = \left\{y \mid y \geq \frac{6}{5}\right\}$

B) f(x): $D = \left\{x \mid x \geq \frac{6}{5}\right\}$, R is all real numbers;
$f^{-1}(x)$: D is all real numbers, $R = \left\{y \mid y \geq \frac{6}{5}\right\}$

C) f(x): $D = \left\{x \mid x \geq \frac{6}{5}\right\}$, $R = \{y \mid y \geq 0\}$;
$f^{-1}(x)$: D is all real numbers, $R = \left\{y \mid y \geq \frac{6}{5}\right\}$

D) f(x): $D = \left\{x \mid x \geq \frac{6}{5}\right\}$, $R = \{y \mid y \geq 0\}$;
$f^{-1}(x)$: $D = \{x \mid x \geq 0\}$, $R = \left\{y \mid y \geq \frac{6}{5}\right\}$

Answer: D

485) $f(x) = \sqrt{5 + 3x}$

A) f(x): $D = \left\{x \mid x \geq -\frac{5}{3}\right\}$, $R = \{y \mid y \geq 0\}$;
$f^{-1}(x)$: $D = \{x \mid x \geq 0\}$, $R = \left\{y \mid y \geq -\frac{5}{3}\right\}$

B) f(x): $D = \left\{x \mid x \geq -\frac{5}{3}\right\}$, $R = \{y \mid y \geq 0\}$;
$f^{-1}(x)$: D is all real numbers, $R = \left\{y \mid y \geq -\frac{5}{3}\right\}$

C) f(x): $D = \{x \mid x \leq 0\}$, $R = \{y \mid y \leq 0\}$;
$f^{-1}(x)$: $D = \{x \mid x \leq 0\}$, $R = \left\{y \mid y \leq -\frac{5}{3}\right\}$

D) f(x): $D = \left\{x \mid x \geq -\frac{5}{3}\right\}$, R is all real numbers;
$f^{-1}(x)$: D is all real numbers, $R = \left\{y \mid y \geq -\frac{5}{3}\right\}$

Answer: A

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SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

486) The profit P for selling x items is given by the equation $P(x) = 2x - 500$. Express the sales amount x as a function of the profit P.

Answer: $x(P) = \frac{1}{2}P + 250$

487) The function $f(x) = |x| - 5$ is not one-to-one.
(a) Find a suitable restriction on the domain of f so that the new function that results is one-to-one.
(b) Find the inverse of f.

Answer: (a) $x \geq 0$ is one correct answer; another equally correct answer is $x \leq 0$.

(b) For the case $x \geq 0$, the inverse is $f^{-1}(x) = x + 5$.

For the case $x \leq 0$, the inverse is $f^{-1}(x) = -x - 5$.

488) The weight W of a bird's brain (in ounces) is related to the volume V of the bird's skull (in cubic ounces) through the function $W(V) = 3.57\sqrt[3]{V} + 1.26$.
(a) Express the skull volume V as a function of brain weight W.
(b) Predict the skull volume of a bird whose brain weighs 5 oz.

Answer: (a) $V(W) = \left(\frac{W - 1.26}{3.57}\right)^3$

(b) 1.15

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

489) The accompanying tables represent a function f that converts seconds to hours and a function g that converts hours to days.

x	86,400	172,800	259,200	345,600	432,000
f(x)	24	48	72	96	120

x	24	48	72	96	120
g(x)	1	2	3	4	5

Express $(f^{-1} \circ g^{-1})(x)$ symbolically.

A) $(f^{-1} \circ g^{-1})(x) = 86{,}400x^2$

B) $(f^{-1} \circ g^{-1})(x) = \frac{x^2}{86{,}400}$

C) $(f^{-1} \circ g^{-1})(x) = \frac{x}{86{,}400}$

D) $(f^{-1} \circ g^{-1})(x) = 86{,}400x$

Answer: D

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490) To remodel a bathroom, a contractor charges $25 per hour plus material costs, which amount to $3675. Therefore, the total cost to remodel the bathroom is given by f(x) = 25x + 3675 where x is the number of hours the contractor works. Find a formula for $f^{-1}(x)$. What does $f^{-1}(x)$ compute?

A) $f^{-1}(x) = \frac{x}{25} - 147$; This computes the total cost if the contractor works x hours.

B) $f^{-1}(x) = \frac{x}{25} - 3675$; This computes the number of hours worked if the total cost is x dollars.

C) $f^{-1}(x) = \frac{x}{25} - 3675$; This computes the total cost if the contractor works x hours.

D) $f^{-1}(x) = \frac{x}{25} - 147$; This computes the number of hours worked if the total cost is x dollars.

Answer: D

Find a formula for the inverse of the function described below.

491) A size 8 dress in Country C is size 34 in Country D. A function that converts dress sizes in Country C to those in Country D is f(x) = x + 26.

A) $f^{-1}(x) = x + 26$ B) $f^{-1}(x) = \frac{x}{-26}$ C) $f^{-1}(x) = \frac{x}{26}$ D) $f^{-1}(x) = x - 26$

Answer: D

492) A size 12 dress in Country C is size 56 in Country D. A function that converts dress sizes in Country C to those in Country D is f(x) = 2(x + 16).

A) $f^{-1}(x) = \frac{x - 16}{2}$ B) $f^{-1}(x) = x - 16$ C) $f^{-1}(x) = \frac{x}{2} + 16$ D) $f^{-1}(x) = \frac{x}{2} - 16$

Answer: D

493) A size 50 dress in Country C is size 9 in Country D. A function that converts dress sizes in Country C to those in Country D is $f(x) = \frac{x}{2} - 16$.

A) $f^{-1}(x) = 2(x + 16)$ B) $f^{-1}(x) = x + 16$ C) $f^{-1}(x) = 2x + 16$ D) $f^{-1}(x) = 2(x - 16)$

Answer: A

494) 32° Fahrenheit = 0° Celsius. A function that converts temperatures in Celsius to those in Fahrenheit is $f(x) = \frac{9}{5}x + 32$.

A) $f^{-1}(x) = x + 32$ B) $f^{-1}(x) = \frac{5}{9}(x + 32)$ C) $f^{-1}(x) = \frac{9}{5}x + 32$ D) $f^{-1}(x) = \frac{5}{9}(x - 32)$

Answer: D

495) An organization determines that the cost per person of chartering a bus is given by the formula

$$C(x) = \frac{150 + 3x}{x},$$

where x is the number of people in the group and C(x) is in dollars.

A) $C^{-1}(x) = \frac{150}{x - 3}$ B) $C^{-1}(x) = \frac{150}{x + 3}$ C) $C^{-1}(x) = \frac{3}{x - 150}$ D) $C^{-1}(x) = \frac{150 + x}{3}$

Answer: A

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1) A
2) B
3) C
4) D
5) B
6) B
7) D
8) D
9) B
10) D
11) C
12) D
13) C
14) D
15) B
16) B
17) C
18) A
19) A
20) A
21) B
22) C
23) D
24) B
25) A
26) B
27) C
28) B
29) A
30) B
31) A
32) A
33) B
34) B
35) C
36) A
37) C
38) D
39) C
40) A
41) C
42) D
43) D
44) D
45) B
46) C
47) C
48) B
49) B
50) B

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51) B
52) D
53) B
54) B
55) D
56) B
57) A
58) D
59) C
60) B
61) A
62) A
63) B
64) A
65) D
66) C
67) A
68) C
69) D
70) A
71) D
72) A
73) D
74) B
75) D
76) C
77) D
78) C
79) B
80) D
81) C
82) C
83) A
84) C
85) C
86) D
87) D
88) B
89) B
90) A
91) B
92) C
93) B
94) D
95) A
96) C
97) E
98) B
99) C
100) C

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101) D
102) D
103) E
104) C
105) A
106) B
107) E
108) B
109) E
110) A
111) A
112) D
113) B
114) A
115) B
116) B
117) A
118) B
119) A
120) C
121) B
122) C
123) A
124) A
125) B
126) D
127) D
128) A
129) B
130) D
131) B
132) D
133) D
134) D
135) C
136) D
137) D
138) C
139) D
140) D
141) C
142) A
143) A
144) B
145) D
146) B
147) B
148) B
149) C
150) B

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151) C
152) A
153) B
154) B
155) B
156) D
157) C
158) C
159) B
160) C
161) A
162) A
163) C
164) A
165) A
166) A
167) A
168) A
169) B
170) B
171) B
172) B
173) A
174) A
175) B
176) A
177) A
178) D
179) A
180) B
181) A
182) C
183) A
184) B
185) A
186) C
187) B
188) D
189) B
190) C
191) C
192) B
193) D
194) A
195) D
196) C
197) A
198) D
199) D
200) D

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201) D
202) A
203) D
204) C
205) A
206) B
207) D
208) B
209) C
210) A
211) D
212) B
213) D
214) D
215) A
216) B
217) D
218) B
219) A
220) D
221) C
222) A
223) D
224) C
225) B
226) A
227) B
228) A
229) A
230) C
231) B
232) A
233) B
234) B
235) A
236) D
237) A
238) B
239) C
240) C

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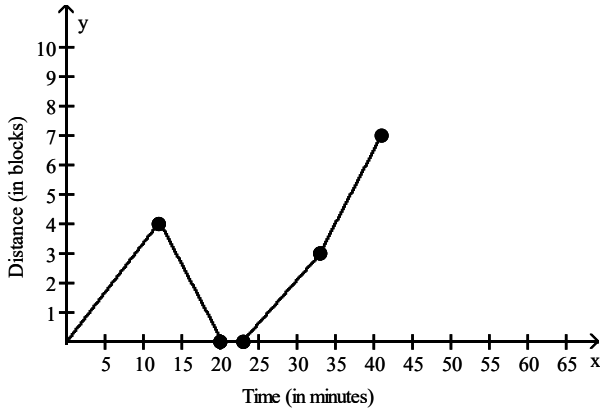

241)

242) B
243) D
244) A
245) A
246) C
247) C
248) B
249) B
250) B
251) A
252) B
253) A
254) A
255) C
256) B
257) C
258) A
259) A
260) B
261) B
262) B
263) B
264) C
265) C
266) A
267) B
268) A
269) C
270) B
271) C
272) C
273) B
274) A
275) A
276) D
277) C

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278) A
279) A
280) B
281) C
282) C
283) D
284) B
285) D
286) D
287) B
288) D
289) D
290) local maximum at (0, 6)
local minimum at (2.67, –3.48)
increasing on (–1, 0) and (2.67, 4)
decreasing on (0, 2.67)
291) local maximum at (0, 0)
local minimum at (0.74, –0.33)
increasing on (–2, 0) and (0.74, 2)
decreasing on (0, 0.74)
292) local maximum at (2.34, 1.61)
local minimum at (–1.9, –9.82)
increasing on (–1.9, 2.34)
decreasing on (–4, –1.9) and (2.34, 5)
293) local maximum at (0, 5)
local minima at (–2.55, 1.17) and (1.05, 4.65)
increasing on (–2.55, 0) and (1.05, 2)
decreasing on (–4, –2.55) and (0, 1.05)
294) B
295) B
296) C
297) C
298) C
299) C
300) B
301) B
302) C
303) B
304) C
305) B
306) A
307) B
308) D
309) C
310) C
311) D
312) D
313) D
314) B
315) A

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316) B
317) D
318) A
319) D
320) A
321) A
322) C
323) B
324) B
325) C
326) D
327) D
328) C
329) C
330) A
331) B
332) B
333) A
334) A
335) A
336) C
337) A
338) A
339) D
340) A
341) D
342) A
343) C
344) C
345) A
346) B
347) C
348) A
349) C
350) B
351) D
352) D
353) D
354) D
355) D
356) A
357) $25.52
$42.69
$C(x) = \begin{cases} 8.8 + 0.6686x & \text{if } 0 \le x \le 25 \\ 4.0475 + 0.8587x & \text{if } x > 25 \end{cases}$
358) $39.70
$49.69
$C(x) = \begin{cases} 4.93 + 0.11589x & \text{if } 0 \le x \le 300 \\ -0.266 + 0.13321x & \text{if } x > 300 \end{cases}$

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359) $18.00
$24.25
$65.50
360) 6.0°C
361) $27.50
$32.50;

$$C(x) = \begin{cases} 20 & \text{if } 0 \le x \le 100 \\ 12.5 + 0.075x & \text{if } 100 < x \le 200 \\ 7.5 + 0.1x & \text{if } x > 200 \end{cases}$$

362) C
363) C
364) A
365) A
366) C
367) C
368) D
369) C
370) D
371) C
372) D
373) C
374) C
375) C
376) D
377) C
378) A
379) D
380) D
381) A
382) C
383) C
384) C
385) B
386) C
387) D
388) A
389) D
390) C
391) C
392) D
393) B
394) A
395) D
396) D
397) B
398) C
399) C
400) D
401) C
402) D

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403) A
404) A
405) B
406) C
407) D
408) C
409) B
410) B
411) A
412) B
413) A
414) C
415) A
416) D
417) B
418) B
419) C
420) A
421) D
422) D
423) D
424) B
425) A
426) D
427) C
428) C
429) C
430) D
431) D
432) C
433) A
434) B
435) A
436) B
437) B
438) A
439) A
440) A
441) B
442) A
443) B
444) B
445) A
446) D
447) C
448) A
449) B
450) B
451) A
452) B

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453) A
454) B
455) B
456) A
457) B
458) D
459) A
460) B
461) C
462) B
463) B
464) A
465) C
466) B
467) D
468) C
469) B
470) C
471) D
472) A
473) D
474) B
475) D
476) D
477) A
478) A
479) A
480) C
481) C
482) A
483) C
484) D
485) A
486) $x(P) = \frac{1}{2}P + 250$
487) (a) $x \geq 0$ is one correct answer; another equally correct answer is $x \leq 0$.
(b) For the case $x \geq 0$, the inverse is $f^{-1}(x) = x + 5$.
For the case $x \leq 0$, the inverse is $f^{-1}(x) = -x - 5$.
488) (a) $V(W) = (\frac{W - 1.26}{3.57})^3$
(b) 1.15
489) D
490) D
491) D
492) D
493) A
494) D
495) A

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