Test Bank for Graphical Approach to Algebra and Trigonometry 7th Hornsby

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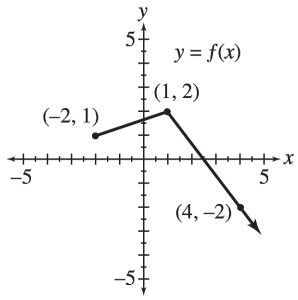
Chapter 2 Test Form A

Date: _____

1. Match the set described in Column I with the correct interval notation from Column II. Choices in Column II may be used once, more than once, or not at all.

Column I	Column II
(a) domain of $f(x)=(x-3)^2$	A. $[3,\infty)$
(b) range of $f(x)=(x-3)^2$	B. $[0,\infty)$
(c) domain of $x=y^2+3$	C. $(3,\infty)$
(d) range of $x=y^2+3$	D. $(-\infty,0]$
(e) domain of $f(x)=3-\sqrt{x}$	E. $[-3,\infty)$
(f) range of $f(x)=\sqrt{3-x}$	F. $(-\infty,3]$
(g) domain of $f(x)=\sqrt[3]{x+3}$	G. $(-\infty,\infty)$
(h) range of $f(x)=\sqrt[3]{x-3}$	H. $(-\infty,0)$
(i) domain of $f(x)=\lvert x-3\rvert$	
(j) range of $f(x)=\lvert x\rvert+3$	

2. The graph of $y=f(x)$ is shown here.



Sketch the graph of each of the following. Use ordered pairs to indicate 3 points on the graph.

(a) $y=f(x+3)$ (b) $y=f(x)+3$ (c) $y=f(-x)$

(d) $y=-f(x)$ (e) $y=3f(x)$ (f) $y=\lvert f(x)\rvert$

3. If the point $(9,\ 12)$ lies on the graph of $y=f(x),$ determine a point on the graph of each equation.

(a) $f\left(\frac{1}{9}x\right)$ (b) $f(3x)$

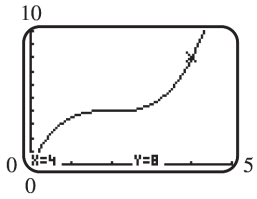
4. Graph $y=f(x)$ by hand.

(a) $f(x)=(x-2)^2+1$ (b) $f(x)=\frac{1}{2}\sqrt{x-3}$

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5. Observe the coordinates displayed at the bottom of the given screen showing a portion of the graph $y = f(x)$. Answer each of the following based on your observation.



(a) If the graph is symmetric with respect to the *y*-axis, what are the coordinates of another point on the graph?

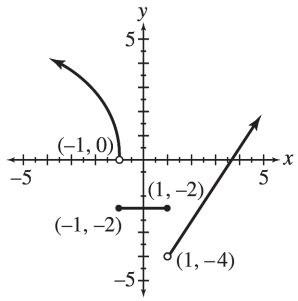
(b) If the graph is symmetric with respect to the origin, what are the coordinates of another point on the graph?

(c) Suppose the graph is symmetric with respect to the *y*-axis. Sketch a typical viewing window with dimensions $[-5, 5]$ by $[0, 10]$. Then draw the graph you would expect to see in this window.

6. (a) Write a description that explains how the graph of $y = 2\sqrt{x-1}+3$ can be obtained by translating the graph of $y = \sqrt{x}$.

(b) Sketch by hand the graph of $y = -2|x+2|-3$. State the domain and the range.

7. Consider the graph of the function shown here.



State the interval(s) over which the function is:

(a) increasing (b) decreasing (c) constant (d) continuous

(e) What is the domain of the function? (f) What is the range of this function?

8. Solve each of the following analytically, showing all steps. Next graph $y_1 = |4x+2|$ and $y_2 = 2$ in the standard viewing window of a graphing calculator. Then state how the graphs support your solution in each case.

(a) $|4x+2| = 2$ (b) $|4x+2| < 2$ (c) $|4x+2| > 2$

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9. Give $f(x)=3x^2-2x-6$ and $g(x)=3x+5,$ find each of the following. Simplify the expression when possible.

(a) $(f-g)(x)$ (b) $\frac{f}{g}(x)$ (c) the domain of $\frac{f}{g}$

(d) $(f\circ g)(x)$ (e) $\frac{f(x+h)-f(x)}{h}(h\neq 0)$

10. Consider the piecewise-defined function defined by $f(x)=\begin{cases} x^2-6 & \text{if } x\le 1 \\ \sqrt{x} & \text{if } x>1 \end{cases}.$

(a) Graph f by hand.

(b) Use a graphing calculator to obtain an accurate graph in the window $[-5,\ 10]$ by $[-10,\ 10]$.

11. The price of postage for mail is defined by the function $P(x)=0.49[\![x+1]\!],$ where x represents the weight of the letter in ounces.

(a) Using dot mode and the window $[0,\ 5]$ by $[0,\ 4],$ graph this function on a graphing calculator.

(b) Use the graph to find the price of a 2.42 ounce envelope.

12. The members of the New Jazz band want to record a new CD. The cost to record a CD is $4000 for studio fees plus $1.50 for each CD produced.

(a) Write a cost function *C*, where x represents the number of CD's produced.

(b) Find the revenue function $R,$ if each CD in part (a) sells for $12.

(c) Write the profit function.

(d) How many CD's must be produced and sold before the band earns a profit?

(e) Support the results of part (d) graphically.

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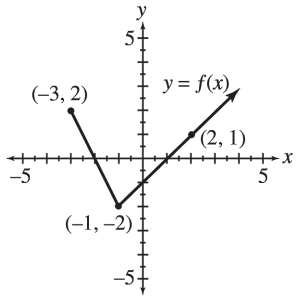
Chapter 2 Test Form B

Date: _____

1. Match the set described in Column I with the correct interval notation from Column II. Choices in Column II may be used once, more than once, or not at all.

Column I	Column II
(a) domain of $f(x)=x^2-5$	A. $(-\infty,\infty)$
(b) range of $f(x)=x^2-5$	B. $[0,\infty)$
(c) domain of $f(x)=\sqrt{x}+5$	C. $(-\infty,0]$
(d) range of $f(x)=\sqrt{x-5}$	D. $[-5,\infty)$
(e) domain of $f(x)=\lvert x\rvert-5$	E. $(5,\infty)$
(f) range of $f(x)=\lvert x+5\rvert$	F. $(-5,\infty)$
(g) domain of $f(x)=\sqrt[3]{x-5}$	G. $(-\infty,5]$
(h) range of $f(x)=\sqrt[3]{x+5}$	H. $[5,\infty)$
(i) domain of $x=y^2-5$	
(j) range of $x=y^2-5$	

2. The graph of $y=f(x)$ is shown here.



Sketch the graph of each of the following. Use ordered pairs to indicate 3 points on the graph.

(a) $y=f(x)-3$ (b) $y=f(x-3)$ (c) $y=-f(x)$

(d) $y=f(-x)$ (e) $y=3f(x)$ (f) $y=\lvert f(x)\rvert$

3. If the point $(15,\ 8)$ lies on the graph of $y=f(x),$ determine a point on the graph of each equation.

(a) $f(x+2)$ (b) $f(x)+3$

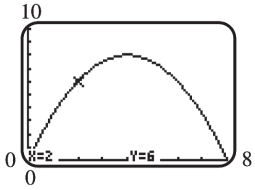
4. Graph $y=f(x)$ by hand.

(a) $f(x)=\lvert x-3\rvert+4$ (b) $f(x)=2\sqrt{4-x}$

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5. Observe the coordinates displayed at the bottom of the given screen showing a portion of the graph $y = f(x)$. Answer each of the following based on your observation.



(a) If the graph is symmetric with respect to the y-axis, what are the coordinates of another point on the graph?

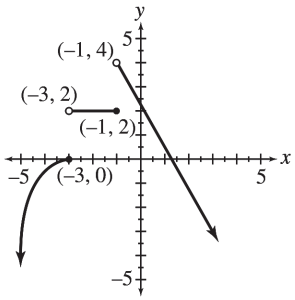
(b) If the graph is symmetric with respect to the origin, what are the coordinates of another point on the graph?

(c) Suppose the graph is symmetric with respect to the y-axis. Sketch a typical viewing window with dimensions $[-8, 8]$ by $[0, 10]$. Then draw the graph you would expect to see in this window.

6. (a) Write a description that explains how the graph of $y = \sqrt[3]{x+5}$ can be obtained by translating the graph of $y = \sqrt[3]{x}$.

(b) Sketch by hand the graph of $y = -|x-2|+3$. State the domain and the range.

7. Consider the graph of the function shown here.



State the interval(s) over which the function is:

(a) increasing (b) decreasing (c) constant (d) continuous

(e) What is the domain of the function? (f) What is the range of this function?

8. Solve each of the following analytically, showing all steps. Next graph $y_1 = |2x-1|$ and $y_2 = 5$ in the standard viewing window of a graphing calculator. Then state how the graphs support your solution in each case.

(a) $|2x-1| = 5$ (b) $|2x-1| < 5$ (c) $|2x-1| > 5$

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9. Give $f(x)=2x^2+5x-3$ and $g(x)=2x+1,$ find each of the following. Simplify the expression when possible.

(a) $(f-g)(x)$ (b) $\frac{f}{g}(x)$ (c) the domain of $\frac{f}{g}$

(d) $(f\circ g)(x)$ (e) $\frac{f(x+h)-f(x)}{h}(h\neq 0)$

10. Consider the piecewise-defined function defined by $f(x)=\begin{cases} x^2-7 & \text{if } x\leq 1 \\ -\sqrt{x}+5 & \text{if } x>1 \end{cases}$.

(a) Graph f by hand.

(b) Use a graphing calculator to obtain an accurate graph in the window $[-5,\ 10]$ by $[-10,\ 10]$.

11. A local tree service company has been hired to clear an area of trees. If x represents the number of hours they will work, where $x>0,$ then the function $P(x)=120[\![x]\!]+435$ gives the total cost in dollars.

(a) Using dot mode and the window $[0,\ 10]$ by $[0,\ 3000],$ graph this function on a graphing calculator.

(b) Use the graph to find the price of an 8.25 hour day.

12. Two friends open a new coffee shop. Their initial cost is $22,000. A dozen doughnuts costs $0.45 to make.

(a) Write a cost function $C,$ where x represents the number of dozen of doughnuts made.

(b) Find the revenue function $R,$ if each dozen in part (a) sells for $10.

(c) Write the profit function.

(d) How many dozen doughnuts must be produced and sold before the men earn a profit?

(e) Support the results of part (d) graphically.

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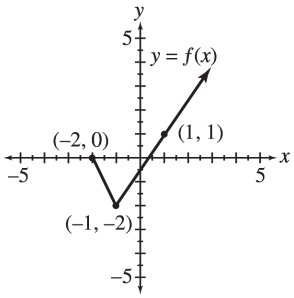
Chapter 2 Test Form C

Date: _____

1. Match the set described in Column I with the correct interval notation from Column II. Choices in Column II may be used once, more than once, or not at all.

Column I	Column II
(a) domain of $f(x)=\sqrt{x}-2$	A. $(-\infty,0)$
(b) range of $f(x)=\sqrt{x+2}$	B. $(-\infty,\infty)$
(c) domain of $f(x)=\lvert x-2\rvert$	C. $(-\infty,2]$
(d) range of $f(x)=\lvert x\rvert+2$	D. $[-2,\infty)$
(e) domain of $f(x)=x^2+2$	E. $(-\infty,0]$
(f) range of $f(x)=x^2+2$	F. $(2,\infty)$
(g) domain of $f(x)=\sqrt[3]{x+2}$	G. $[0,\infty)$
(h) range of $f(x)=\sqrt[3]{x}-2$	H. $[2,\infty)$
(i) domain of $x=y^2+2$	
(j) range of $x=y^2+2$	

2. The graph of $y=f(x)$ is shown here.



Sketch the graph of each of the following. Use ordered pairs to indicate 3 points on the graph.

(a) $y=f(x+2)$ (b) $y=f(x)+2$ (c) $y=f(-x)$

(d) $y=-f(x)$ (e) $y=2f(x)$ (f) $y=\lvert f(x)\rvert$

3. If the point $(-3,\ 4)$ lies on the graph of $y=f(x),$ determine a point on the graph of each equation.

(a) $f(x+1)+2$ (b) $f(3x)-1$

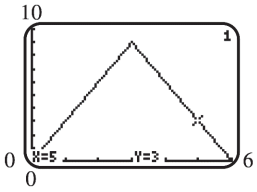
4. Graph $y=f(x)$ by hand.

(a) $f(x)=(x-1)^3+5$ (b) $f(x)=-2\sqrt{2-x}$

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5. Observe the coordinates displayed at the bottom of the given screen showing a portion of the graph $y = f(x)$. Answer each of the following based on your observation.



(a) If the graph is symmetric with respect to the *y*-axis, what are the coordinates of another point on the graph?

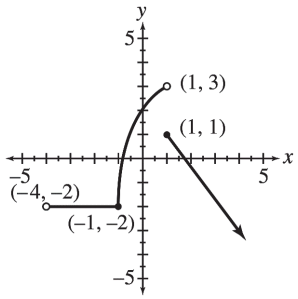
(b) If the graph is symmetric with respect to the origin, what are the coordinates of another point on the graph?

(c) Suppose the graph is symmetric with respect to the *y*-axis. Sketch a typical viewing window with dimensions $[-6,\ 6]$ by $[0,\ 10]$. Then draw the graph you would expect to see in this window.

6. (a) Write a description that explains how the graph of $y = \frac{1}{2}\sqrt[3]{x+3}$ can be obtained by translating the graph of $y = \sqrt[3]{x}$.

(b) Sketch by hand the graph of $y = -3|x-6|+4$. State the domain and the range.

7. Consider the graph of the function shown here.



State the interval(s) over which the function is:

(a) increasing (b) decreasing (c) constant (d) continuous

(e) What is the domain of the function? (f) What is the range of this function?

8. Solve each of the following analytically, showing all steps. Next graph $y_1 = |3x-6|$ and $y_2 = 3$ in the standard viewing window of a graphing calculator. Then state how the graphs support your solution in each case.

(a) $|3x-6| = 3$ (b) $|3x-6| < 3$ (c) $|3x-6| > 3$

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9. Give $f(x) = 4x^2 - 3x + 2$ and $g(x) = 3x + 2$, find each of the following. Simplify the expression when possible.

   (a) $(f - g)(x)$ (b) $\frac{f}{g}(x)$ (c) the domain of $\frac{f}{g}$

   (d) $(f \circ g)(x)$ (e) $\frac{f(x+h) - f(x)}{h} (h \neq 0)$

10. Consider the piecewise-defined function defined by $f(x) = \begin{cases} 4\sqrt{-x} + 2 & \text{if } x < -4 \\ 0.5x^2 - 6 & \text{if } x \geq -4 \end{cases}$.

    (a) Graph f by hand.

    (b) Use a graphing calculator to obtain an accurate graph in the window $[-15, 10]$ by $[-10, 20]$.

11. The PayMore car rental company is a sports car rental agency. If x represents the number of days you rent the car, where $x > 0$, then the function $P(x) = 225[\![x + 1]\!] + 400$ gives the total cost in dollars.

    (a) Using dot mode and the window $[0, 10]$ by $[0, 3700]$, graph this function on a graphing calculator.

    (b) Use the graph to find the price of 2.75 days.

12. The class of 2018 wants to raise money for a class trip by selling mini-doughnuts. Their initial cost is $500 to rent the equipment. A bag of doughnuts costs $0.40 to make.

    (a) Write a cost function C, where x represents the number of bags of doughnuts made.

    (b) Find the revenue function R, if each dozen in part (a) sells for $5.

    (c) Write the profit function.

    (d) How many bags of doughnuts must be produced and sold before the class earns a profit?

    (e) Support the results of part (d) graphically.

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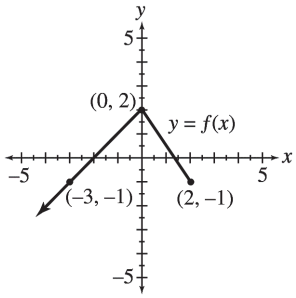
Chapter 2 Test Form D

Date: _____

1. Match the set described in Column I with the correct interval notation from Column II. Choices in Column II may be used once, more than once, or not at all.

Column I	Column II
(a) domain of $f(x)=x^2+9$	A. $[0,\infty)$
(b) range of $f(x)=x^2+9$	B. $[9,\infty)$
(c) domain of $f(x)=\sqrt{x}-9$	C. $(-\infty,9]$
(d) range of $f(x)=\sqrt{x+9}$	D. $(-9,\infty)$
(e) domain of $f(x)=\lvert x-9\rvert$	E. $(-\infty,\infty)$
(f) range of $f(x)=\lvert x\rvert+9$	F. $(9,\infty)$
(g) domain of $f(x)=\sqrt[3]{x+9}$	G. $(-\infty,0]$
(h) range of $f(x)=\sqrt[3]{x}-9$	H. $[-9,\infty)$
(i) domain of $x=y^2+9$	
(j) range of $x=y^2+9$	

2. The graph of $y=f(x)$ is shown here.



Sketch the graph of each of the following. Use ordered pairs to indicate 3 points on the graph.

(a) $y=f(x-2)$ (b) $y=f(x)-2$ (c) $y=-f(x)$

(d) $y=f(-x)$ (e) $y=2f(x)$ (f) $y=\lvert f(x)\rvert$

3. If the point $(-2,-1)$ lies on the graph of $y=f(x)$, determine a point on the graph of each equation.

(a) $f(x-3)+1$ (b) $f(x)-10$

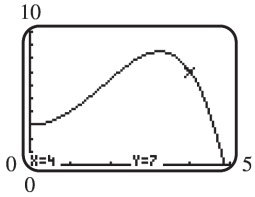
4. Graph $y=f(x)$ by hand.

(a) $f(x)=-\lvert x-2\rvert-4$ (b) $f(x)=\sqrt{x-1}+2$

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5. Observe the coordinates displayed at the bottom of the given screen showing a portion of the graph $y = f(x)$. Answer each of the following based on your observation.



(a) If the graph is symmetric with respect to the y-axis, what are the coordinates of another point on the graph?

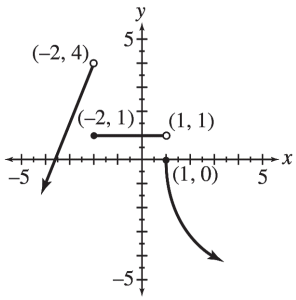
(b) If the graph is symmetric with respect to the origin, what are the coordinates of another point on the graph?

(c) Suppose the graph is symmetric with respect to the y-axis. Sketch a typical viewing window with dimensions $[-5, 5]$ by $[0, 10]$. Then draw the graph you would expect to see in this window.

6. (a) Write a description that explains how the graph of $y = \sqrt[3]{x-4}+5$ can be obtained by translating the graph of $y = \sqrt[3]{x}$.

(b) Sketch by hand the graph of $y = \frac{1}{2}|x-4|+3$. State the domain and the range.

7. Consider the graph of the function shown here.



State the interval(s) over which the function is:

(a) increasing (b) decreasing (c) constant (d) continuous

(e) What is the domain of the function? (f) What is the range of this function?

8. Solve each of the following analytically, showing all steps. Next graph $y_1 = |2x+3|$ and $y_2 = 3$ in the standard viewing window of a graphing calculator. Then state how the graphs support your solution in each case.

(a) $|2x+3| = 3$ (b) $|2x+3| < 3$ (c) $|2x+3| > 3$

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9. Give $f(x) = -2x^2 + 2x - 1$ and $g(x) = 2x - 3$, find each of the following. Simplify the expression when possible.

   (a) $(f - g)(x)$ (b) $\frac{f}{g}(x)$ (c) the domain of $\frac{f}{g}$

   (d) $(f \circ g)(x)$ (e) $\frac{f(x+h) - f(x)}{h} (h \neq 0)$

10. Consider the piecewise-defined function defined by $f(x) = \begin{cases} x^2 - 8 & \text{if } x < 4 \\ -\sqrt{x} - 4 & \text{if } x \geq 4 \end{cases}$.

    (a) Graph f by hand.

    (b) Use a graphing calculator to obtain an accurate graph in the window $[-5, 15]$ by $[-10, 5]$.

11. The local printing company produces wedding invitations. If x represents the number of invitations, where $x > 0$, then the function $C(x) = 55\left\lceil\left\lceil \frac{x}{38} \right\rceil\right\rceil + 75$ gives the total cost in dollars.

    (a) Using dot mode and the window $[0, 250]$ by $[0, 500]$, graph this function on a graphing calculator.

    (b) Use the graph to find the total cost of 150 invitations.

12. The class of 2018 wants to raise money for a class trip by printing and selling silk screen t-shirts. Their initial cost is $100 to rent the silk screen machine. Each t-shirt costs $2.75 to make.

    (a) Write a cost function C, where x represents the number of t-shirts produced.

    (b) Find the revenue function R, if each t-shirt in part (a) sells for $20.

    (c) Write the profit function.

    (d) How many t-shirts must be produced and sold before the class earns a profit?

    (e) Support the results of part (d) graphically.

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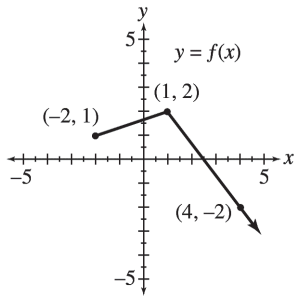
Chapter 2 Test Form A

Date: _____

1. Match the set described in Column I with the correct interval notation from Column II. Choices in Column II may be used once, more than once, or not at all.

Column I	Column II
(a) domain of $f(x)=(x-3)^2$	A. $[3,\infty)$
(b) range of $f(x)=(x-3)^2$	B. $[0,\infty)$
(c) domain of $x=y^2+3$	C. $(3,\infty)$
(d) range of $x=y^2+3$	D. $(-\infty,0]$
(e) domain of $f(x)=3-\sqrt{x}$	E. $[-3,\infty)$
(f) range of $f(x)=\sqrt{3-x}$	F. $(-\infty,3]$
(g) domain of $f(x)=\sqrt[3]{x+3}$	G. $(-\infty,\infty)$
(h) range of $f(x)=\sqrt[3]{x-3}$	H. $(-\infty,0)$
(i) domain of $f(x)=\lvert x-3\rvert$	
(j) range of $f(x)=\lvert x\rvert+3$	

2. The graph of $y=f(x)$ is shown here.



Sketch the graph of each of the following. Use ordered pairs to indicate 3 points on the graph.

(a) $y=f(x+3)$ (b) $y=f(x)+3$ (c) $y=f(-x)$

(d) $y=-f(x)$ (e) $y=3f(x)$ (f) $y=\lvert f(x)\rvert$

3. If the point $(9,\ 12)$ lies on the graph of $y=f(x),$ determine a point on the graph of each equation.

(a) $f\left(\frac{1}{9}x\right)$ (b) $f(3x)$

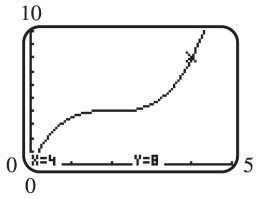
4. Graph $y=f(x)$ by hand.

(a) $f(x)=(x-2)^2+1$ (b) $f(x)=\frac{1}{2}\sqrt{x-3}$

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5. Observe the coordinates displayed at the bottom of the given screen showing a portion of the graph $y = f(x)$. Answer each of the following based on your observation.



(a) If the graph is symmetric with respect to the *y*-axis, what are the coordinates of another point on the graph?

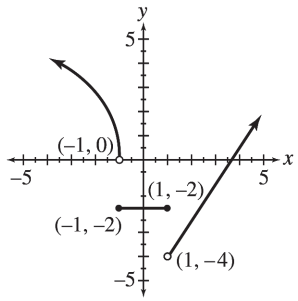
(b) If the graph is symmetric with respect to the origin, what are the coordinates of another point on the graph?

(c) Suppose the graph is symmetric with respect to the *y*-axis. Sketch a typical viewing window with dimensions $[-5, 5]$ by $[0, 10]$. Then draw the graph you would expect to see in this window.

6. (a) Write a description that explains how the graph of $y = 2\sqrt{x-1}+3$ can be obtained by translating the graph of $y = \sqrt{x}$.

(b) Sketch by hand the graph of $y = -2|x+2|-3$. State the domain and the range.

7. Consider the graph of the function shown here.



State the interval(s) over which the function is:

(a) increasing (b) decreasing (c) constant (d) continuous

(e) What is the domain of the function? (f) What is the range of this function?

8. Solve each of the following analytically, showing all steps. Next graph $y_1 = |4x+2|$ and $y_2 = 2$ in the standard viewing window of a graphing calculator. Then state how the graphs support your solution in each case.

(a) $|4x+2| = 2$ (b) $|4x+2| < 2$ (c) $|4x+2| > 2$

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9. Give $f(x)=3x^2-2x-6$ and $g(x)=3x+5,$ find each of the following. Simplify the expression when possible.

(a) $(f-g)(x)$ (b) $\frac{f}{g}(x)$ (c) the domain of $\frac{f}{g}$

(d) $(f\circ g)(x)$ (e) $\frac{f(x+h)-f(x)}{h}(h\neq 0)$

10. Consider the piecewise-defined function defined by $f(x)=\begin{cases} x^2-6 & \text{if } x\le 1 \\ \sqrt{x} & \text{if } x>1 \end{cases}.$

(a) Graph f by hand.

(b) Use a graphing calculator to obtain an accurate graph in the window $[-5,\ 10]$ by $[-10,\ 10]$.

11. The price of postage for mail is defined by the function $P(x)=0.49[\![x+1]\!],$ where x represents the weight of the letter in ounces.

(a) Using dot mode and the window $[0,\ 5]$ by $[0,\ 4],$ graph this function on a graphing calculator.

(b) Use the graph to find the price of a 2.42 ounce envelope.

12. The members of the New Jazz band want to record a new CD. The cost to record a CD is $4000 for studio fees plus $1.50 for each CD produced.

(a) Write a cost function *C*, where x represents the number of CD's produced.

(b) Find the revenue function $R,$ if each CD in part (a) sells for $12.

(c) Write the profit function.

(d) How many CD's must be produced and sold before the band earns a profit?

(e) Support the results of part (d) graphically.

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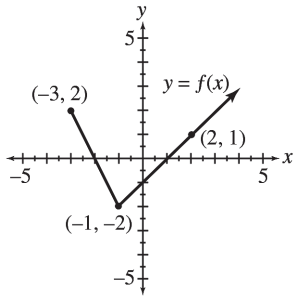
Chapter 2 Test Form B

Date: _____

1. Match the set described in Column I with the correct interval notation from Column II. Choices in Column II may be used once, more than once, or not at all.

Column I	Column II
(a) domain of $f(x)=x^2-5$	A. $(-\infty,\infty)$
(b) range of $f(x)=x^2-5$	B. $[0,\infty)$
(c) domain of $f(x)=\sqrt{x}+5$	C. $(-\infty,0]$
(d) range of $f(x)=\sqrt{x-5}$	D. $[-5,\infty)$
(e) domain of $f(x)=\lvert x\rvert-5$	E. $(5,\infty)$
(f) range of $f(x)=\lvert x+5\rvert$	F. $(-5,\infty)$
(g) domain of $f(x)=\sqrt[3]{x-5}$	G. $(-\infty,5]$
(h) range of $f(x)=\sqrt[3]{x+5}$	H. $[5,\infty)$
(i) domain of $x=y^2-5$	
(j) range of $x=y^2-5$	

2. The graph of $y=f(x)$ is shown here.



Sketch the graph of each of the following. Use ordered pairs to indicate 3 points on the graph.

(a) $y=f(x)-3$ (b) $y=f(x-3)$ (c) $y=-f(x)$

(d) $y=f(-x)$ (e) $y=3f(x)$ (f) $y=\lvert f(x)\rvert$

3. If the point $(15,\ 8)$ lies on the graph of $y=f(x),$ determine a point on the graph of each equation.

(a) $f(x+2)$ (b) $f(x)+3$

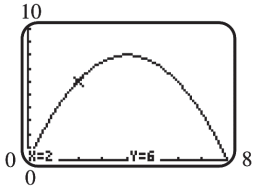
4. Graph $y=f(x)$ by hand.

(a) $f(x)=\lvert x-3\rvert+4$ (b) $f(x)=2\sqrt{4-x}$

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5. Observe the coordinates displayed at the bottom of the given screen showing a portion of the graph $y = f(x)$. Answer each of the following based on your observation.



(a) If the graph is symmetric with respect to the y-axis, what are the coordinates of another point on the graph?

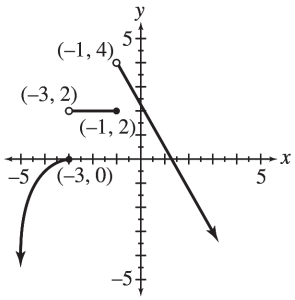
(b) If the graph is symmetric with respect to the origin, what are the coordinates of another point on the graph?

(c) Suppose the graph is symmetric with respect to the y-axis. Sketch a typical viewing window with dimensions $[-8, 8]$ by $[0, 10]$. Then draw the graph you would expect to see in this window.

6. (a) Write a description that explains how the graph of $y = \sqrt[3]{x+5}$ can be obtained by translating the graph of $y = \sqrt[3]{x}$.

(b) Sketch by hand the graph of $y = -|x-2|+3$. State the domain and the range.

7. Consider the graph of the function shown here.



State the interval(s) over which the function is:

(a) increasing (b) decreasing (c) constant (d) continuous

(e) What is the domain of the function? (f) What is the range of this function?

8. Solve each of the following analytically, showing all steps. Next graph $y_1 = |2x-1|$ and $y_2 = 5$ in the standard viewing window of a graphing calculator. Then state how the graphs support your solution in each case.

(a) $|2x-1| = 5$ (b) $|2x-1| < 5$ (c) $|2x-1| > 5$

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9. Give $f(x)=2x^2+5x-3$ and $g(x)=2x+1,$ find each of the following. Simplify the expression when possible.

(a) $(f-g)(x)$ (b) $\frac{f}{g}(x)$ (c) the domain of $\frac{f}{g}$

(d) $(f\circ g)(x)$ (e) $\frac{f(x+h)-f(x)}{h}(h\neq 0)$

10. Consider the piecewise-defined function defined by $f(x)=\begin{cases} x^2-7 & \text{if } x\leq 1 \\ -\sqrt{x}+5 & \text{if } x>1 \end{cases}$.

(a) Graph f by hand.

(b) Use a graphing calculator to obtain an accurate graph in the window $[-5,\ 10]$ by $[-10,\ 10]$.

11. A local tree service company has been hired to clear an area of trees. If x represents the number of hours they will work, where $x>0,$ then the function $P(x)=120[\![x]\!]+435$ gives the total cost in dollars.

(a) Using dot mode and the window $[0,\ 10]$ by $[0,\ 3000],$ graph this function on a graphing calculator.

(b) Use the graph to find the price of an 8.25 hour day.

12. Two friends open a new coffee shop. Their initial cost is $22,000. A dozen doughnuts costs $0.45 to make.

(a) Write a cost function $C,$ where x represents the number of dozen of doughnuts made.

(b) Find the revenue function $R,$ if each dozen in part (a) sells for $10.

(c) Write the profit function.

(d) How many dozen doughnuts must be produced and sold before the men earn a profit?

(e) Support the results of part (d) graphically.

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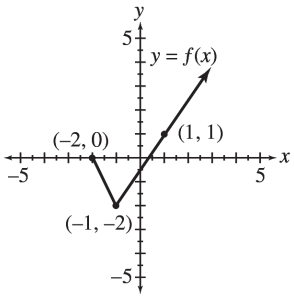
Chapter 2 Test Form C

Date: _____

1. Match the set described in Column I with the correct interval notation from Column II. Choices in Column II may be used once, more than once, or not at all.

Column I	Column II
(a) domain of $f(x)=\sqrt{x}-2$	A. $(-\infty,0)$
(b) range of $f(x)=\sqrt{x+2}$	B. $(-\infty,\infty)$
(c) domain of $f(x)=\lvert x-2\rvert$	C. $(-\infty,2]$
(d) range of $f(x)=\lvert x\rvert+2$	D. $[-2,\infty)$
(e) domain of $f(x)=x^2+2$	E. $(-\infty,0]$
(f) range of $f(x)=x^2+2$	F. $(2,\infty)$
(g) domain of $f(x)=\sqrt[3]{x+2}$	G. $[0,\infty)$
(h) range of $f(x)=\sqrt[3]{x}-2$	H. $[2,\infty)$
(i) domain of $x=y^2+2$	
(j) range of $x=y^2+2$	

2. The graph of $y=f(x)$ is shown here.



Sketch the graph of each of the following. Use ordered pairs to indicate 3 points on the graph.

(a) $y=f(x+2)$ (b) $y=f(x)+2$ (c) $y=f(-x)$

(d) $y=-f(x)$ (e) $y=2f(x)$ (f) $y=\lvert f(x)\rvert$

3. If the point $(-3,\ 4)$ lies on the graph of $y=f(x),$ determine a point on the graph of each equation.

(a) $f(x+1)+2$ (b) $f(3x)-1$

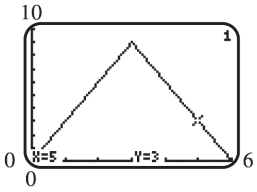
4. Graph $y=f(x)$ by hand.

(a) $f(x)=(x-1)^3+5$ (b) $f(x)=-2\sqrt{2-x}$

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5. Observe the coordinates displayed at the bottom of the given screen showing a portion of the graph $y = f(x)$. Answer each of the following based on your observation.



(a) If the graph is symmetric with respect to the *y*-axis, what are the coordinates of another point on the graph?

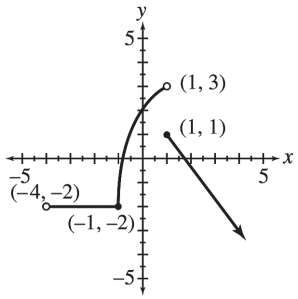
(b) If the graph is symmetric with respect to the origin, what are the coordinates of another point on the graph?

(c) Suppose the graph is symmetric with respect to the *y*-axis. Sketch a typical viewing window with dimensions $[-6,\ 6]$ by $[0,\ 10]$. Then draw the graph you would expect to see in this window.

6. (a) Write a description that explains how the graph of $y = \frac{1}{2}\sqrt[3]{x+3}$ can be obtained by translating the graph of $y = \sqrt[3]{x}$.

(b) Sketch by hand the graph of $y = -3|x-6|+4$. State the domain and the range.

7. Consider the graph of the function shown here.



State the interval(s) over which the function is:

(a) increasing (b) decreasing (c) constant (d) continuous

(e) What is the domain of the function? (f) What is the range of this function?

8. Solve each of the following analytically, showing all steps. Next graph $y_1 = |3x-6|$ and $y_2 = 3$ in the standard viewing window of a graphing calculator. Then state how the graphs support your solution in each case.

(a) $|3x-6| = 3$ (b) $|3x-6| < 3$ (c) $|3x-6| > 3$

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9. Give $f(x) = 4x^2 - 3x + 2$ and $g(x) = 3x + 2$, find each of the following. Simplify the expression when possible.

   (a) $(f - g)(x)$ (b) $\frac{f}{g}(x)$ (c) the domain of $\frac{f}{g}$

   (d) $(f \circ g)(x)$ (e) $\frac{f(x+h) - f(x)}{h} (h \neq 0)$

10. Consider the piecewise-defined function defined by $f(x) = \begin{cases} 4\sqrt{-x} + 2 & \text{if } x < -4 \\ 0.5x^2 - 6 & \text{if } x \geq -4 \end{cases}$.

    (a) Graph f by hand.

    (b) Use a graphing calculator to obtain an accurate graph in the window $[-15, 10]$ by $[-10, 20]$.

11. The PayMore car rental company is a sports car rental agency. If x represents the number of days you rent the car, where $x > 0$, then the function $P(x) = 225[\![x + 1]\!] + 400$ gives the total cost in dollars.

    (a) Using dot mode and the window $[0, 10]$ by $[0, 3700]$, graph this function on a graphing calculator.

    (b) Use the graph to find the price of 2.75 days.

12. The class of 2018 wants to raise money for a class trip by selling mini-doughnuts. Their initial cost is $500 to rent the equipment. A bag of doughnuts costs $0.40 to make.

    (a) Write a cost function C, where x represents the number of bags of doughnuts made.

    (b) Find the revenue function R, if each dozen in part (a) sells for $5.

    (c) Write the profit function.

    (d) How many bags of doughnuts must be produced and sold before the class earns a profit?

    (e) Support the results of part (d) graphically.

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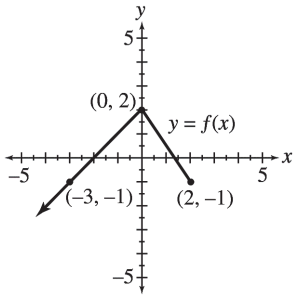
Chapter 2 Test Form D

Date: _____

1. Match the set described in Column I with the correct interval notation from Column II. Choices in Column II may be used once, more than once, or not at all.

Column I	Column II
(a) domain of $f(x)=x^2+9$	A. $[0,\infty)$
(b) range of $f(x)=x^2+9$	B. $[9,\infty)$
(c) domain of $f(x)=\sqrt{x}-9$	C. $(-\infty,9]$
(d) range of $f(x)=\sqrt{x+9}$	D. $(-9,\infty)$
(e) domain of $f(x)=\lvert x-9\rvert$	E. $(-\infty,\infty)$
(f) range of $f(x)=\lvert x\rvert+9$	F. $(9,\infty)$
(g) domain of $f(x)=\sqrt[3]{x+9}$	G. $(-\infty,0]$
(h) range of $f(x)=\sqrt[3]{x}-9$	H. $[-9,\infty)$
(i) domain of $x=y^2+9$	
(j) range of $x=y^2+9$	

2. The graph of $y=f(x)$ is shown here.



Sketch the graph of each of the following. Use ordered pairs to indicate 3 points on the graph.

(a) $y=f(x-2)$ (b) $y=f(x)-2$ (c) $y=-f(x)$

(d) $y=f(-x)$ (e) $y=2f(x)$ (f) $y=\lvert f(x)\rvert$

3. If the point $(-2,-1)$ lies on the graph of $y=f(x)$, determine a point on the graph of each equation.

(a) $f(x-3)+1$ (b) $f(x)-10$

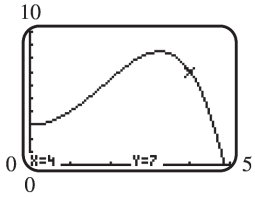
4. Graph $y=f(x)$ by hand.

(a) $f(x)=-\lvert x-2\rvert-4$ (b) $f(x)=\sqrt{x-1}+2$

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5. Observe the coordinates displayed at the bottom of the given screen showing a portion of the graph $y = f(x)$. Answer each of the following based on your observation.



(a) If the graph is symmetric with respect to the y-axis, what are the coordinates of another point on the graph?

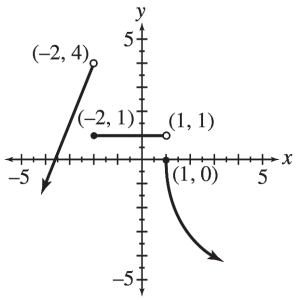
(b) If the graph is symmetric with respect to the origin, what are the coordinates of another point on the graph?

(c) Suppose the graph is symmetric with respect to the y-axis. Sketch a typical viewing window with dimensions $[-5, 5]$ by $[0, 10]$. Then draw the graph you would expect to see in this window.

6. (a) Write a description that explains how the graph of $y = \sqrt[3]{x-4}+5$ can be obtained by translating the graph of $y = \sqrt[3]{x}$.

(b) Sketch by hand the graph of $y = \frac{1}{2}|x-4|+3$. State the domain and the range.

7. Consider the graph of the function shown here.



State the interval(s) over which the function is:

(a) increasing (b) decreasing (c) constant (d) continuous

(e) What is the domain of the function? (f) What is the range of this function?

8. Solve each of the following analytically, showing all steps. Next graph $y_1 = |2x+3|$ and $y_2 = 3$ in the standard viewing window of a graphing calculator. Then state how the graphs support your solution in each case.

(a) $|2x+3| = 3$ (b) $|2x+3| < 3$ (c) $|2x+3| > 3$

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9. Give $f(x) = -2x^2 + 2x - 1$ and $g(x) = 2x - 3$, find each of the following. Simplify the expression when possible.

   (a) $(f - g)(x)$ (b) $\frac{f}{g}(x)$ (c) the domain of $\frac{f}{g}$

   (d) $(f \circ g)(x)$ (e) $\frac{f(x+h) - f(x)}{h} (h \neq 0)$

10. Consider the piecewise-defined function defined by $f(x) = \begin{cases} x^2 - 8 & \text{if } x < 4 \\ -\sqrt{x} - 4 & \text{if } x \geq 4 \end{cases}$.

    (a) Graph f by hand.

    (b) Use a graphing calculator to obtain an accurate graph in the window $[-5, 15]$ by $[-10, 5]$.

11. The local printing company produces wedding invitations. If x represents the number of invitations, where $x > 0$, then the function $C(x) = 55\left\lceil\left\lceil \frac{x}{38} \right\rceil\right\rceil + 75$ gives the total cost in dollars.

    (a) Using dot mode and the window $[0, 250]$ by $[0, 500]$, graph this function on a graphing calculator.

    (b) Use the graph to find the total cost of 150 invitations.

12. The class of 2018 wants to raise money for a class trip by printing and selling silk screen t-shirts. Their initial cost is $100 to rent the silk screen machine. Each t-shirt costs $2.75 to make.

    (a) Write a cost function C, where x represents the number of t-shirts produced.

    (b) Find the revenue function R, if each t-shirt in part (a) sells for $20.

    (c) Write the profit function.

    (d) How many t-shirts must be produced and sold before the class earns a profit?

    (e) Support the results of part (d) graphically.

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