Test Bank for Problem Solving Approach to Mathematics for Elementary School Teachers 13th Billstein

cess Complete Test Bank for Problem Solving Approach to Mathematics for Elementary School Teachers 13th Billst

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

Find the number of terms in the sequence or the sum of the sequence as requested.

1) Find the following sum: 1 + 6 + 11 + . . . + 111
A) 1286 B) 1290 C) 1289 D) 1288
Answer: D

2) Find the following sum: 5 + 9 + 13 + . . . + 145
A) 2700 B) 2705 C) 2690 D) 2710
Answer: A

3) Find the following sum: 5 + 18 + 31 + . . . + 525
A) 10,875 B) 10,870 C) 10,865 D) 10,855
Answer: C

4) Find the following sum: 3 + 403 + 803 + . . . + 4003
A) 18,027 B) 22,033 C) 22,030 D) 22,036
Answer: B

5) Find the following sum: 16 + 21 + 26 + . . . + 136
A) 1868 B) 1900 C) 1764 D) 1916
Answer: B

Solve the problem.

6) Which is greater, E or P, and by how much?
E = 1 + 3 + 5 + 7 + . . . + 91
P = 2 + 4 + 6 + 8 + . . . + 92
A) P is greater by 47 B) E is greater by 45 C) P is greater by 46 D) E is greater by 46
Answer: C

7) How many different ways can you make change for a 50–cent coin using nickels and dimes?
A) 7 B) 6 C) 5 D) 4
Answer: B

8) How many different ways can you make change for a 50–cent coin using quarters, dimes, and nickels?
A) 10 B) 11 C) 9 D) 8
Answer: A

9) How many different ways can you make change for a 25–cent coin using nickels and pennies?
A) 4 B) 5 C) 7 D) 6
Answer: D

10) How many different ways can you make change for a 25–cent coin using dimes, nickels, and pennies?
A) 10 B) 12 C) 11 D) 13
Answer: B

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11) How many different amounts of money can you pay if you use two coins including only nickels, dimes, and quarters?

A) 7 B) 4 C) 6 D) 5

Answer: C

12) How many different amounts of money can you pay if you use three coins including nickels, dimes, and quarters?

A) 8 B) 11 C) 10 D) 9

Answer: C

13) How many different amounts of money can you pay if you use four coins including dimes and quarters?

A) 4 B) 5 C) 3 D) 6

Answer: B

14) How many different amounts of money can you pay if you use five coins including quarters and dimes?

A) 5 B) 7 C) 4 D) 6

Answer: D

15) How many different ways can you make change for 75 cents using quarters, dimes, and nickels?

A) 17 B) 15 C) 18 D) 16

Answer: C

16) How many different amounts of money can you pay if you use four coins including quarters, nickels, and dimes?

A) 15 B) 14 C) 13 D) 12

Answer: B

Complete the magic (addition) square.

17) Use each number 10, 11, 12, 13, 14, 15, 16, 17, and 18 once.

13		
12	14	
17	10	15

A)

13	18	16
12	14	11
17	10	15

B)

13	16	11
12	14	18
17	10	15

C)

13	16	18
12	14	11
17	10	15

D)

13	18	11
12	14	16
17	10	15

Answer: D

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18) Use each number 9, 10, 11, 12, 13, 14, 15, 16, and 17 once.

16		12
9	13	
	15	10

A)

16	11	12
9	13	17
14	15	10

B)

16	14	12
9	13	11
17	15	10

C)

16	17	12
9	13	11
14	15	10

D)

16	11	12
9	13	14
17	15	10

Answer: A

19) Use each number 9, 10, 11, 12, 13, 14, 15, 16, and 17 once.

12		10
	13	15
	9	

A)

12	17	10
11	13	15
14	9	16

B)

12	16	10
11	13	15
14	9	17

C)

12	17	10
11	13	15
16	9	14

D)

12	14	10
11	13	15
16	9	17

Answer: C

20) Use each number 24, 25, 26, 27, 28, 29, 30, 31, and 32 once.

	26	27
	28	32
		25

A)

30	26	27
24	28	32
29	31	25

B)

31	26	27
30	28	32
24	29	25

C)

29	26	27
24	28	32
31	30	25

D)

31	26	27
24	28	32
29	30	25

Answer: D

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21) Use each number 10, 11, 12, 13, 14, 15, 16, 17, and 18 once.

15		
	14	12
11	18	

A)

15	10	16
17	14	12
11	18	13

B)

15	13	17
16	14	12
11	18	10

C)

15	10	17
16	14	12
11	18	13

D)

15	13	16
17	14	12
11	18	10

Answer: C

22) Use each number 61, 62, 63, 64, 65, 66, 67, 68, and 69 once.

62		66
		61
64	63	

A)

62	68	66
69	65	61
64	63	67

B)

62	68	66
69	67	61
64	63	65

C)

62	67	66
69	65	61
64	63	68

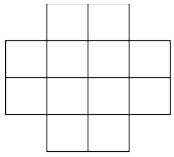
D)

62	67	66
68	65	61
64	63	69

Answer: C

Determine how many of the indicated shape there are in the figure.

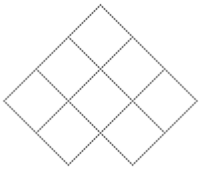
23) Squares (of any size)



A) 12 B) 18 C) 13 D) 17

Answer: D

24) Squares (of any size)

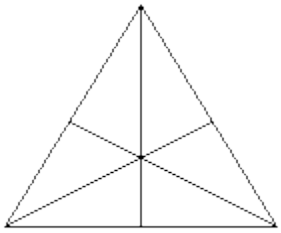


A) 9 B) 11 C) 12 D) 8

Answer: B

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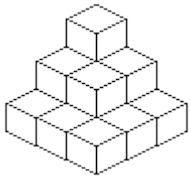
25) Triangles (of any size)



A) 19 B) 12 C) 15 D) 16

Answer: D

26) Cubes (of any size)



A) 15 B) 9 C) 10 D) 14

Answer: A

Solve the problem.

27) Alamo, Brushy, Chet, and Dolly are in an armadillo race. Chet is the slowest. Dolly is faster than Alamo, but slower than Brushy. Name the finishing order of the armadillos.

A) Alamo, Dolly, Brushy, Chet B) Brushy, Alamo, Dolly, Chet

C) Brushy, Dolly, Alamo, Chet D) Alamo, Brushy, Dolly, Chet

Answer: C

28) A pencil box and a notebook together cost $6.08. The notebook costs $0.50 more than the pencil box. How much does the notebook cost?

A) $3.79 B) $3.29 C) $2.29 D) $2.79

Answer: B

29) A drink and a sandwich together cost $4.00. The sandwich costs $1.50 more than the drink. How much does the sandwich cost?

A) $4.25 B) $2.75 C) $0.25 D) $1.25

Answer: B

30) The temperature rose 7 degrees from 10:00 A.M. to noon. By 3:00 P.M. the temperature had doubled. From 3:00 P.M. to 6:00 P.M. the temperature rose 4 degrees to 94 degrees. What was the temperature at 10:00 A.M. that morning?

A) 83 degrees B) 38 degrees C) 52 degrees D) 42 degrees

Answer: B

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

Provide an appropriate response.

31) Use the strategy of writing equations to justify that if $y = 2x$ and $z = y + 5$, then z is greater than x.

Answer: Putting the value of y in the second equation we get $z = 2x + 5$, which indicates that z is greater than x.

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32) What is the sum of three consecutive integers in terms of the middle number x? What would the sum be in terms of the middle number for five and seven consecutive integers? What can you generalize about the sum of n consecutive integers where n is odd?

Answer: 3x, 5x, 7x, nx

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

Find the requested term in the sequence.

33) The next term in 2, 4, 8, 16, 32, . . .

A) 64 B) 32 C) 128 D) 16

Answer: A

34) The next term in 7, 21, 63, 189, 567, . . .

A) 45,927 B) 15,309 C) 5103 D) 1701

Answer: D

Provide an appropriate response.

35) Look for a pattern in the sequence of figures shown below, and use your reasoning to draw the next figure.



A) 

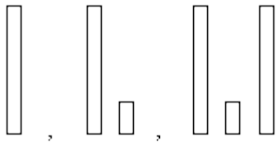
B) 

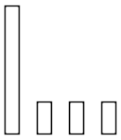
C) 

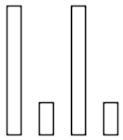
D) 

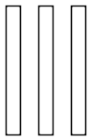
Answer: D

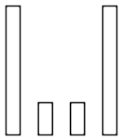
36) Look for a pattern in the sequence of figures shown below, and use your reasoning to draw the next figure.



A) 

B) 

C) 

D) 

Answer: B

37) Look for a pattern in the sequence of figures shown below, and use your reasoning to draw the next figure.



A) 

B) 

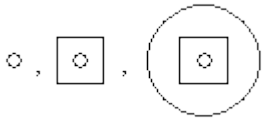
C) 

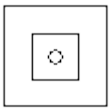
D) 

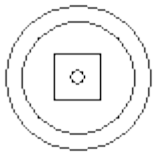
Answer: A

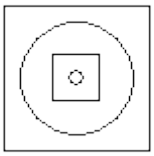
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38) Look for a pattern in the sequence of figures shown below, and use your reasoning to draw the next figure.



A) 

B) 

C) 

D) 

Answer: C

39) Use a traditional clock face to determine the next three terms in the following sequence:
1, 11, 9, 7, 5, . . .

A) 4, 2, 12 B) 3, 1, 11 C) 2, 2, 11 D) 3, 3, 10

Answer: B

Find the first five terms in the sequence whose nth term is given.

40) $n^2 + 2$

A) 2, 8, 18, 32, 50 B) 3, 6, 11, 14, 22 C) 4, 6, 8, 10, 12 D) 3, 6, 11, 18, 27

Answer: D

41) $4n + 5$

A) 9, 14, 19, 24, 29 B) 9, 18, 27, 36, 45 C) 20, 40, 60, 80, 100 D) 9, 13, 17, 21, 25

Answer: D

42) $7n - 3$

A) 4, 8, 12, 16, 20 B) 4, 11, 18, 25, 32
C) –21, –42, –63, –84, –105 D) 10, 17, 24, 31, 38

Answer: B

Indicate whether the sequence is arithmetic, geometric, or neither. Give the next two terms in the sequence.

43) 5, 8, 11, 14, 17, . . .

A) Geometric; 20; 28 B) Neither; 25; 28 C) Arithmetic; 20; 23

Answer: C

44) 8, 13, 18, 23, 28, . . .

A) Geometric; 33; 41 B) Arithmetic; 33; 38 C) Neither; 33; 38

Answer: B

45) 7, 21, 63, 189, 567, . . .

A) Geometric; 1701; 5103 B) Neither; 573; 577 C) Arithmetic; 570; 576

Answer: A

46) 10, 50, 250, 1250, 6250, . . .

A) Neither; 62,500; 312,500 B) Arithmetic; 312,500; 468,750 C) Geometric; 31,250; 156,250

Answer: C

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47) 15, 18, 24, 30, 36, . . .
A) Geometric; 42; 48 B) Arithmetic; 42; 48 C) Neither; 42; 48
Answer: C

48) 2, 11, 12, 13, 14, . . .
A) Neither; 15; 16 B) Arithmetic; 8; 9 C) Geometric; 17; 16
Answer: A

49) 4, 12, 96, 768, 6144, . . .
A) Arithmetic; 49,152; 393,216 B) Geometric; 49,152; 393,216 C) Neither; 49,152; 393,216
Answer: C

50) 3, 45, 675, 10,125, 151,875, . . .
A) Geometric; 2,278,125; 34,171,875
B) Arithmetic; 2,278,125; 34,171,875
C) Neither; 2,278,125; 34,171,875
Answer: C

51) 1, 6, 7, 13, 20, . . .
A) Neither; 33; 53 B) Arithmetic; 33; 53 C) Geometric; 33; 53
Answer: A

Find the requested term in the sequence.

52) The 100th term in 9, 15, 21, 27, 33, . . .
A) 609 B) 603 C) 604 D) 597
Answer: B

53) The nth term in 5, 10, 15, 20, 25, . . .
A) 5n + 2 B) 5n + 5 C) 5n D) 5n – 5
Answer: C

54) The 100th term in 3, 5, 12, 19, 26, . . .
A) 691 B) 698 C) 705 D) 684
Answer: A

55) The 10th term in 15, 24, 25, 26, 27, . . .
A) 32 B) 33 C) 34 D) 31
Answer: A

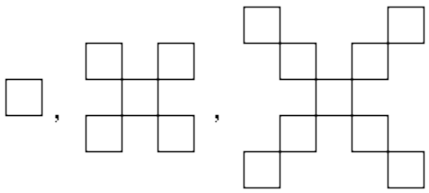
56) The 18th term in 6, 18, 54, $18 \cdot 3^2$, $18 \cdot 3^3$, . . .
A) $18 \cdot 3^{16}$ B) $18 \cdot 3^{18}$ C) $18 \cdot 3^{17}$ D) $18 \cdot 3^{20}$
Answer: A

57) The 10th term in 10, 10.4, 10.16, 10.64, 10.256, . . .
A) 10.65536 B) 10.262144 C) 10.1048576 D) 262144
Answer: B

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Provide an appropriate response.

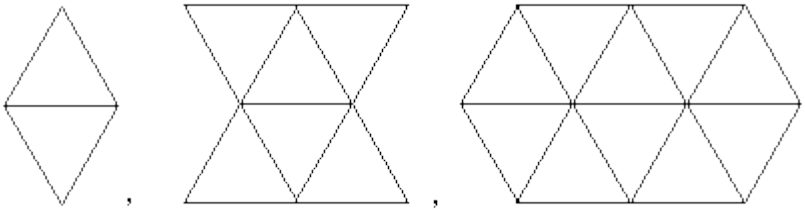
58) Look for a pattern in the sequence of figures shown below. How many squares are needed for the 4th figure? The nth figure?



A) 13, 3n + 1 B) 12, 4n – 2 C) 13, 4n – 3 D) 14, 4n + 3

Answer: C

59) Look for a pattern in the sequence of figures shown below. How many triangles are needed for the 4th figure? The nth figure?



A) 14, 3n + 2 B) 12, 3n C) 12, 4n – 4 D) 14, 4n – 2

Answer: D

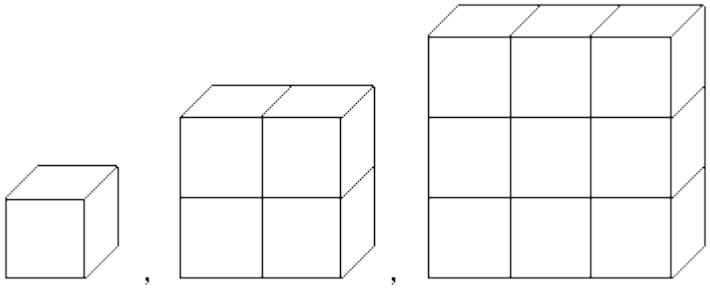
60) Following is a sequence of black balls and white balls. How many black balls are needed for the 100th term?



A) 202 B) 200 C) 198 D) 201

Answer: B

61) In the following sequence, the figures are made of cubes that are glued together. If the exposed surface is to be painted, then how many squares will be painted in the 10th figure?

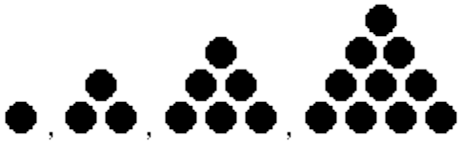


A) 240 B) 250 C) 270 D) 260

Answer: A

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62) The following sequence is made of black circles. How many circles are needed for the 10th figure? The 15th figure?



A) 57, 108 B) 55, 120 C) 45, 105 D) 66, 136

Answer: B

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

63) At what term will the geometric sequence 1, 2, 4, 8, . . . become greater than the arithmetic sequence 0, 20, 40, 60, . . .?

Answer: 9th term

64) Which terms, n and m, in the arithmetic sequence 175, 250, 325, . . . and the geometric sequence 1, 10, 100, . . ., respectively, have the same value? What is the value?

Answer: n = 12 and m = 4; 1000.

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

Solve the problem.

65) A man earned $3000 the first year he worked. If he received a raise of $600 at the end of each year, what was his salary during the 15th year?

A) $8400 B) None of these C) $11,400 D) $12,000

Answer: C

66) An auditorium has 15 rows with 10 seats in the first row, 12 in the second row, 14 in the third row, and so forth. How many seats are in the auditorium?

A) 390 B) 360 C) 300 D) 255

Answer: B

67) If a person puts 1¢ in a piggy bank on the first day, 2¢ on the second day, 3¢ on the third day, and so forth, how much money will be in the bank after 50 days?

A) $12.75 B) $25.50 C) $0.50 D) $6.38

Answer: A

68) A collection of dimes is arranged in a triangular array with 17 coins in the base row, 16 in the next, 15 in the next, and so forth. Find the value of the collection.

A) $7.65 B) $15.30 C) $30.60 D) $1.53

Answer: B

69) The population of a town was 26,900 at the beginning of 1970. If the population decreased 400 people per year, how many people lived in the town at the beginning of 1985?

A) 6000 B) 20,500 C) 20,900 D) 21,300

Answer: C

70) A rose garden has 16 bushes in one row, 13 bushes in the next row, then 10, and so on. If there are 51 bushes in the garden, in how many rows are they planted?

A) 6 B) 7 C) 5 D) 3

Answer: A

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Find the number of terms in the sequence or the sum of the sequence as requested.

71) Find the sum of the following arithmetic sequence.
1 + 2 + 3 + . . . + 900
A) 811,801 B) 405,000 C) 405,450 D) 202,500
Answer: C

72) Find the sum of the following arithmetic sequence.
4 + 8 + 12 + . . . + 100
A) 1250 B) 156.25 C) 10,000 D) 1300
Answer: D

73) Find the sum of the following arithmetic sequence.
10 + 11 + 12 + . . . + 200
A) 20,100 B) 20,064 C) 20,055 D) 19,864
Answer: C

74) Find the sum of the following arithmetic sequence.
11 + 13 + . . . + 501
A) 62,976 B) 51,076 C) 63,001 D) 62,475
Answer: A

Provide an appropriate response.

75) The first difference of a sequence is 2, 4, 6, 8, 10, . . . Find the first six terms of the original sequence if the first term in the original sequence is 10.
A) 12, 16, 22, 30, 40, 52 B) 10, 20, 40, 60, 80, 100
C) 10, 12, 16, 22, 30, 40 D) 10, 12, 14, 16, 18, 20
Answer: C

76) The first difference of a sequence is 3, 6, 9, 12, 15, . . . Find the first six terms of the original sequence if the sum of the first two terms is 17.
A) 7, 10, 13, 16, 19, 22 B) 17, 20, 23, 26, 29, 32 C) 17, 20, 26, 35, 47, 62 D) 7, 10, 16, 25, 37, 52
Answer: D

77) The first difference of a sequence is 2, 4, 6, 8, 10, . . . Find the first six terms of the original sequence if the third term of the original sequence is 62.
A) 60, 58, 62, 68, 70, 72 B) 62, 64, 66, 68, 70, 72 C) 56, 58, 62, 68, 70, 72 D) 56, 58, 62, 68, 76, 86
Answer: D

Find the number of terms in the sequence or the sum of the sequence as requested.

78) Find the number of terms in the following arithmetic sequence.
1, 3, 5, 7, . . ., 39
A) 22 B) 39 C) 19 D) 20
Answer: D

79) Find the number of terms in the following arithmetic sequence.
8, 11, 14, 17, . . ., 80
A) 27 B) 25 C) 75 D) 72
Answer: B

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80) Find the number of terms in the following arithmetic sequence.
3, 9, 15, 21, . . ., 81
A) 8 B) 11 C) 14 D) 17
Answer: C

81) Find the number of terms in the following arithmetic sequence.
1, 5, 9, 13, . . ., 93
A) 5 B) 21 C) 24 D) 20
Answer: C

82) How many terms are there in the sequence 6, 12, 24, 48, 96, . . ., 24,576?
A) 12 B) 13 C) 11 D) 14
Answer: B

83) How many terms are there in the sequence 1, 5, 5^2, 5^3, . . ., 5^{25}?
A) 25 B) 26 C) 27 D) 24
Answer: B

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

84)
Answer:

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

Find the requested term in the sequence.

85) Given that the sequence 4, 8, x, y, 32, . . . is a Fibonacci sequence, find x and y.
A) 20, 28 B) 12, 20 C) 12, 16 D) 16, 24
Answer: B

86) Given that the sequence 5, x, y, 625, 3125, . . . is a geometric sequence, find x and y.
A) 10, 125 B) 25, 125 C) 5, 25 D) 25, 50
Answer: B

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1) D
2) A
3) C
4) B
5) B
6) C
7) B
8) A
9) D
10) B
11) C
12) C
13) B
14) D
15) C
16) B
17) D
18) A
19) C
20) D
21) C
22) C
23) D
24) B
25) D
26) A
27) C
28) B
29) B
30) B
31) Putting the value of y in the second equation we get $z = 2x + 5$, which indicates that z is greater than x.
32) 3x, 5x, 7x, nx
33) A
34) D
35) D
36) B
37) A
38) C
39) B
40) D
41) D
42) B
43) C
44) B
45) A
46) C
47) C
48) A
49) C
50) C

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51) A
52) B
53) C
54) A
55) A
56) A
57) B
58) C
59) D
60) B
61) A
62) B
63) 9th term
64) n = 12 and m = 4; 1000.
65) C
66) B
67) A
68) B
69) C
70) A
71) C
72) D
73) C
74) A
75) C
76) D
77) D
78) D
79) B
80) C
81) C
82) B
83) B
84)
85) B
86) B

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