1. Write or draw the next term for each given sequence

<table>
<thead>
<tr>
<th>a)</th>
<th>b)</th>
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</thead>
<tbody>
<tr>
<td>16, 13, 10, 7,</td>
<td>11, 16, 21, 26, 31,</td>
</tr>
<tr>
<td>36</td>
<td></td>
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<table>
<thead>
<tr>
<th>c)</th>
<th>d)</th>
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<tbody>
<tr>
<td></td>
<td>5 Rings</td>
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2. Ruben earns $15 an hour. Show how much he earns if he works for 1 hour, 2 hours, 3 hours, 4 hours or 5 hours.

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<tbody>
<tr>
<td>15</td>
<td>30</td>
<td>45</td>
<td>60</td>
<td>75</td>
</tr>
<tr>
<td>1 hour</td>
<td>2 hours</td>
<td>3 hours</td>
<td>4 hours</td>
<td>5 hours</td>
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</tbody>
</table>

3. Every Sunday your parents give you $20 for your weekly chores, and you spend $12 every Saturday when you hang out with your friends. Write a sequence to show how much money you will have earned and spent for the next 4 weeks starting with $20.

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<tbody>
<tr>
<td>20</td>
<td>98</td>
<td>24</td>
<td>116</td>
<td>36</td>
</tr>
<tr>
<td>Sun (week 1)</td>
<td>Sat.</td>
<td>Sun (wk 2,</td>
<td>Sat.</td>
<td>Sun (wk 3)</td>
</tr>
</tbody>
</table>

4. Circle all the characteristics of the following graphs.

- discrete or continuous
- linear or non-linear
- Only increasing
- Only decreasing
- Both increasing and decreasing
- Neither increasing or decreasing
- Function
- Not a function
5. Circle all the characteristics of the following graphs

<table>
<thead>
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<tr>
<td>Both increasing and</td>
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<tr>
<td>decreasing</td>
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<tr>
<td>Neither increasing or</td>
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<tr>
<td>decreasing</td>
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<tr>
<td>Function</td>
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<tr>
<td>Not a function</td>
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</tbody>
</table>

6. Circle all the characteristics of the following graphs

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<tr>
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7. Circle all the characteristics of the following graphs

- discrete or continuous
- linear or non-linear
- Only increasing
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- Not a function

8. | Input | Output |
<table>
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<tbody>
<tr>
<td>4</td>
<td>8</td>
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<tr>
<td>8</td>
<td>12</td>
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<tr>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>16</td>
<td>20</td>
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<tr>
<td>20</td>
<td>24</td>
</tr>
</tbody>
</table>

a) Write the corresponding ordered pairs
\[ \{(4,8), (8,12), (12,16), (16,20), (20,24)\} \]

b) Tell whether each relation is a function
   Yes, it is a function

Matching for problems 9-13. Match the following scenarios to the appropriate graphs on the next page.
(*Note: There are 6 graphs and 5 scenarios, not all graphs will have a match)

D 9. The number of supervisors for the first 8 school events.

E 10. A car’s speed for the first 9 seconds as it goes from a parked position to exiting the parking lot.

B 11. You start with 6 gallons of water in a bucket. Water is leaking out continuously for the next 4 hours until the bucket is empty.

A 12. You are breeding rabbits for FFA, at the end of the first year you have one pair of rabbits, and every consecutive year for the next 3 years you add 2 pairs of rabbits.
13. A rule that makes all numbers positive. For every input the output is positive.
14. Solve the equation for the variable.

\[
4(x + 8) = 100 \\
4x + 32 = 100 \\
x = 17
\]

or

\[
\frac{4(x+8)}{4} = \frac{100}{4} \\
x+8 = 25 \\
x = 17
\]

15. Solve the equation for the variable.

\[-5(x - 3) = -30 \\
x - 3 = 6 \\
x = 9
\]

16. Solve the equation for the variable.

\[2x + 16 = 5(x - 1) \\
2x + 16 = 5x - 5 \\
-2x + 5 - 2x + 5 \\
21 = 3x \\
7 = x
\]

17. Solve the equation for the variable.

\[4(x - 5) = -3(x - 7) \\
4x - 20 = -3x + 21 \\
+3x + 20 + 3x + 20 \\
7x = 41 \\
x = \frac{41}{7} \approx 5.86
\]

18. Two catering companies will host a children’s sports banquet. Company A charges a fixed fee of $50 plus $8 per person. Company B charges a fixed fee of $150 plus $3 per person. Which company would charge less to cater for 100 people? (Make sure to show how much each company would charge you).

**Company B will charge less for 100 people**

19. Delia is joining a gym. Get fit charges $20 per month, plus a $99 initial set-up fee. Work it out charges $30 per month, plus a $50 initial set-up fee. Which gym would cost less if you only planned on being a member for 4 months? (Make sure to show how much each company would charge you).

**Work it out**

\[
20x + 99 \\
80 + 99 \\
179
\]

**Get Fit**

\[
30x + 50 \\
120 + 50 \\
170
\]
20. You need to choose a shipping company. Ship Fast charges $2.00 per package plus $1.00 per pound. Speedy Delivery charges $3.00 per package plus $0.50 per pound. The graph of the equations that represent this situation is shown. For what package weight do both companies charge the same price?

21. Malia is buying fabric to make her Halloween costume. For the same material, Sew Right charges $4.00 per yard and an initial $5.00 convenience fee. Stitch Plus charges $6.00 per yard and a $2.00 convenience fee. The graph of the equations that represent this situation is shown. Which store should Malia buy the fabric from if she is buying 5 yards of material?

22. Identify the x-intercepts and y-intercepts from the graph.

\[
\begin{align*}
\text{x-int} & \quad \text{y-int} \\
(3,0) & \quad (0,-1)
\end{align*}
\]
23. Identify the x-intercepts and y-intercepts from the graph.

24. Identify the x-intercepts and y-intercepts from the graph.

25. If possible state the y-intercept from the given linear equation
   \[ 3x + 6y = -12 \]
   \[ y = -2 \]
   \[ (0, -2) \]

26. If possible state the y-intercept from the given linear equation
   \[ 5x - y = -20 \]
   \[ y = 20 \]
   \[ (0, 20) \]

27. If possible state the y-intercept from the given linear equation
   \[ 10x = 2y - 12 \]
   \[ y = (0, 6) \]

28. Write an equation for the linear graph.

29. Write an equation for the linear graph.

30. Write in slope-intercept form.
   \[ 2x + y = -8 \]
   \[ y = -2x - 8 \]

31. Write in slope-intercept form.
   \[ -8x + 4y = -12 \]

32. Solve the equation for y.
   \[ 3x + 5y = 9 \]
   \[ y = \frac{3}{5}x + \frac{9}{5} \]

33. Solve the equation for y.
   \[ 7y = 3y + 8 \]
   \[ 4y = 8 \]
   \[ y = 2 \]
34. Graph the following equations

a) \( y = \frac{3}{5}x - 4 \)

b) \( y = -\frac{1}{3}x - 2 \)

c) \( y = -x \)

d) \( y = 4x + 1 \)

35. Ernesto earns $9.25 per hour that he works. Write an algebraic equation that shows the amount of money \( E \), that Ernesto earns in \( n \) hours?

\[ E = 9.25n \]

36. Julio is ordering a submarine sandwich from the corner deli. The deli charges $6.25 for a 7 inch sub. Some additional toppings cost extra. Julio’s sandwich with two extra toppings costs $7.75. What is the cost per additional topping?

\[
\frac{7.75 - 6.25}{2} = \frac{1.50}{2} = \frac{75}{2} \text{d per topping}
\]

37. Write a linear equation to model the situation. Then solve.

a) Your new puppy weighs 8 pounds and gains half of a pound every month. Write a linear equation that models this problem. What is the weight in 11 months?

Equation \( y = 8 + \frac{1}{2}x \) 

Solution \( 8 + 5.5 = \) 13.5 pounds
38. Create a graph that models the following situation. Then solve.
Your savings account had a balance of $2525.00 and on your summer vacation you plan to spend $80 per week. Write a linear equation that models this problem. What is the balance after your 8 week summer vacation?

Solution $1,085$

\[ y = 2525 - 80x \]
\[ = 2525 - 640 \]
\[ = 1885 \]

39. Create a table of values and an equation to model the situation. Then Solve.
You decided to plant some ferns in your yard. The ferns you bought are 5 inches tall. They told you that with proper care they would grow 2 inches every month. Write a linear equation that models this problem. How tall will your fern be 1 year?

<table>
<thead>
<tr>
<th>Month</th>
<th>Height</th>
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<tbody>
<tr>
<td>1</td>
<td>7</td>
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<tr>
<td>2</td>
<td>9</td>
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<td>3</td>
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<td>11</td>
<td>27</td>
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<tr>
<td>12</td>
<td>29</td>
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</tbody>
</table>

Equation \( y = 5 + 2x \) Solution 99 in

40. Write the equation of a line in slope intercept form that has a slope of 5 and passes though the point (1, 6).

\[ y = mx + b \]
\[ 6 = 5(1) + b \]
\[ 6 = 5 + b \]
\[ b = 1 \]
41. Write the equation of a line in slope intercept form that has a slope of -2 and passes through (2, -3)

\[-3 = -2(2) + b\]
\[-3 = -4 + b\]
\[1 = b\]

\[y = -2x + 1\]

42. Write the equation of a line in slope intercept form line that passes through the points (2, 11) and (5, 23)

\[\text{slope} = \frac{23 - 11}{5 - 2} = \frac{12}{3} = 4\]
\[11 = 4(2) + b\]
\[11 = 8 + b\]
\[3 = b\]

\[y = 4x + 3\]

43. Write the equation of a line in slope intercept form that passes through the points (6, 1) and (9, 3)

\[\frac{3 - 1}{9 - 6} = \frac{2}{3}\]
\[1 = \frac{2}{3}(6) + b\]
\[1 = 4 + b\]
\[-3 = b\]

\[y = \frac{2}{3}x - 3\]

44. Solve the linear system

\[2x + y = 4\]
\[x - y = 2\]

\[3x = 6\]
\[x = 2\]
\[2 - y = 2\]
\[-y = 0\]

\[(2, 0)\]

45. Solve the linear system

\[3(x - y = 4) \rightarrow 9x - 3y = 12\]
\[-9x + 3y = -12\]
\[0 = 0\]

\[\text{INFINITE SOLUTION}\]

46. Solve the linear system

\[-3(x + 7y = 12) \rightarrow -3x - 21y = -36\]
\[3x - 5y = 10\]
\[-26y = -26\]
\[y = 1\]

\[(5, 1)\]

47. Solve the linear system

\[4x + 3y = 31\]
\[y = 2x + 7\]

\[4x + 3(2x + 7) = 31\]
\[4x + 6x + 21 = 31\]
\[10x = 10\]
\[x = 1\]

\[y = 9\]

\[(1, 9)\]

48. A sightseeing boat charges $5 for children and $8 for adults. On its first trip of the day, it collected $439 for 71 passengers. How many children and how many adults were there?

\[-5(a + c = 71)\] passengers
\[-5a - 5c = -355\]
\[8a + 5c = 439\]

\[\frac{3a}{a = 28} \Rightarrow a = 28\]
\[c = 42\]
49. Given the graph of the system of equations, determine the number of solutions.

(a) [Graph showing two lines intersecting] NO SOLUTION

(b) [Graph showing two lines intersecting at a point] INFINITE SOLUTION

(c) [Graph showing two lines intersecting] ONE SOLUTION

50. Determine the type of transformation

<table>
<thead>
<tr>
<th>Original Image</th>
<th>Transformed Image</th>
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<tbody>
<tr>
<td><img src="image1.png" alt="Original Image" /></td>
<td><img src="image2.png" alt="Transformed Image" /></td>
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</table>

A. rotation  B. reflection  C. translation  D. dilation

51. Determine the type of transformation

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<tbody>
<tr>
<td><img src="image3.png" alt="Original Image" /></td>
<td><img src="image4.png" alt="Transformed Image" /></td>
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</table>

A. rotation  B. reflection  C. translation  D. dilation
52. Determine the type of transformation

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A. rotation   B. reflection   C. translation   D. dilation

53. Consider the following diagram of the original image, \( \triangle ABC \), and its non-rigid transformation which preserves angle measurements but not side lengths. Which of the following describes this transformation?

A. rotation   B. reflection   C. translation   D. dilation

54. What is the integer closest to \( \frac{31}{7} \)?

A. 1   B. 3   C. 4   D. 5

55. Pat drove her car 147 miles on a trip. At the end of the trip the car’s total mileage was 3,835. What was the mileage of the car at the beginning of Pat’s trip?

A. 3,982   B. 3,688   C. 3,588   D. 2,688

56. The temperature at noon on each of five successive days is plotted on the graph shown to the right. Which day had the greatest increase in noon temperature from that of the previous day?

A. Tuesday   B. Wednesday   C. Thursday   D. Friday
57. $-4 + 2 \cdot 3 =

A. -10  B. -6  C. 2  D. 6

58. Of the following numbers, which best approximates $1,084 - 108.4$?

A. 10  B. 100  C. 1,000  D. 10,000

58. Molly and Pete each earn $5 an hour at part time jobs. If on a certain day Pete works $1 \frac{1}{2}$ hours and Molly works $2 \frac{3}{4}$ hours, what is the total amount of their earnings that day?

$\left(2.75 \times 5\right) = 13.75$

$4.25 \text{ total hours}$

A. $25$  B. $21.25$  C. $18.33$  D. $15.00$

59. At the mall, Mary bought 3 CDs at $x$ dollars each and spent $9$ on lunch for a total of $45$. Which of the following equations could be used to find $x$?

$A. \ 3x + 9 = 45$  $B. \ x + 3 + 9 = 45$  $C. \ 9x + 3 = 45$  $D. \ 3x - 9 = 45$

60. What number divided by $-3$ gives $12$ as the result?

A. $-36$  B. $-4$  C. $4$  D. $36$

61. As a percent, what part of the rectangular region shown to the right is shaded?

A. $37.5\%$  B. $50.0\%$  C. $60.0\%$  D. $62.5\%$

62. Which point on the number line above is closest to $-\frac{2}{3}$?

A. A  B. B  C. C  D. D
63. In the right triangle ABC shown to the right, what is the length of AC?

A. 10  B. 14  C. 24  D. 48

64. A wire was bent into the shape of a rectangle with width 5 and length 7. If the wire is then bent into the shape of a square, what is the length of a side of the square?

A. 3  B. 6  C. 24  D. 35

65. \[
\frac{1 + \frac{2}{3}}{1 - \frac{1}{6}} = \frac{\frac{5}{3}}{\frac{5}{6}} = \frac{5}{3} \cdot \frac{6}{5} = \frac{2}{1}
\]

A. -4  B. -2  C. 2  D. 4

66. In the figure shown to the right, what fractional part of the circle is shaded?

A. \(\frac{4}{15}\)  B. \(\frac{3}{8}\)  C. \(\frac{5}{8}\)  D. \(\frac{11}{15}\)

\[
\frac{1}{3} + \frac{2}{5} = \frac{5}{15} + \frac{6}{15} = \frac{11}{15}
\]

67. In the square shown to the right, what is the area of the shaded region?

A. 36  B. 24  C. 18  D. 12
68. At certain time of day a telephone pole casts a shadow 24 feet long and a person 6 feet all casts a shadow 3 feet long. In feet, what is the height of the telephone pole?

\[
\frac{6}{x} = \frac{24}{3} \quad \text{or} \quad \frac{x}{24} = \frac{6}{3}
\]

A. 12 \quad B. 21 \quad C. 27 \quad D. 48

69. If three times a number \(x\) is subtracted from 12, the result is 30. Which of the following equations represents this statement?

A. \(12 - 3x = 30\) \quad B. \(3 - 12x = 30\) \quad C. \(12x - 3 = 30\) \quad D. \(3x - 12 = 30\)

70. The graph shown to the right compares four breakfast cereals. Based on this graph, which of the following statements about these four cereals is true?

A. The cereals with more sugar cost less.
B. The cereals with more sugar cost more.
C. Cereal T has the least amount of sugar per serving.
D. More people buy cereal Q

71. Evan mixed \(2 \frac{2}{3}\) pounds of nuts with \(1 \frac{5}{6}\) pounds of raisins and \(1 \frac{7}{8}\) pounds of chocolate chips. How many pounds did this mixture weigh?

A. \(\frac{5}{24}\) \quad B. \(\frac{14}{17}\) \quad C. \(\frac{1}{6}\) \quad D. \(\frac{3}{8}\)

72. Which of the following is equal to \(0 \times 7\)?

A. \(0 - 2\) \quad B. \(\frac{3}{0}\) \quad C. \(0 + 4\) \quad D. \(\frac{0}{5}\)