Name _____

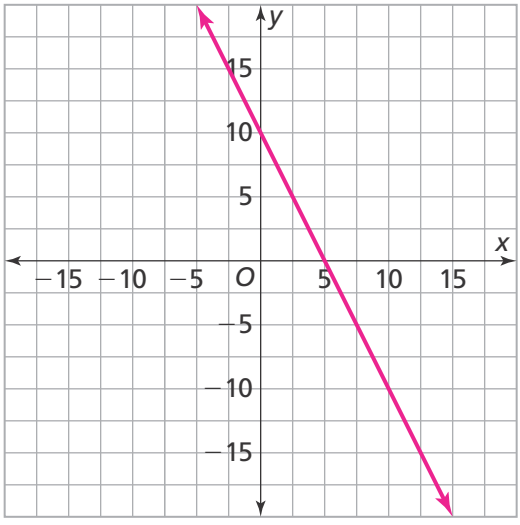
Topics **1–4**
Cumulative/
Benchmark Assessment

1. How many solutions does the equation have? **1 point**

$$3\left(\frac{7}{3}x + \frac{4}{3}\right) - 2x + 8 = 5x + 12$$

Infinitely many solutions

2. Graph the equation $y = -2x + 10$. **1 point**



3. The average grain of salt is 0.0003 meters wide. *Rhinovirus*, which causes the common cold, is 0.00000003 meters wide. How many times wider is a grain of salt than *Rhinovirus*? Write your answer as a single digit times a power of 10. **1 point**

Ⓐ 1×10^2 times

Ⓑ 1×10^3 times

Ⓒ 1×10^4 times

Ⓓ 1×10^5 times

4. An engineer is designing a roller coaster. The tallest peak is 310 feet high. The roller coaster travels 155 horizontal feet as it descends the hill. What is the slope of the hill? **1 point**

Ⓐ -2

Ⓑ -1.55

Ⓒ 1.55

Ⓓ 2

5. Classify each number as rational or irrational. **1 point**

$$\frac{1}{3}, 0.325, 0.4562345\ldots, \sqrt{50}, -\frac{14}{2}$$

Rational	Irrational
0.325 $-\frac{14}{2}$ $\frac{1}{3}$	**0.4562345...** $\sqrt{50}$

6. Which of the following numbers is written in scientific notation? **1 point**

Ⓐ 17

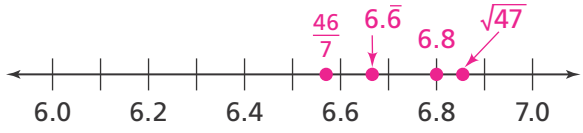
Ⓑ 17×10^6

Ⓒ 3.734×10^{-14}

Ⓓ 3.734

7. Compare and order the numbers below by plotting them on the number line. **1 point**

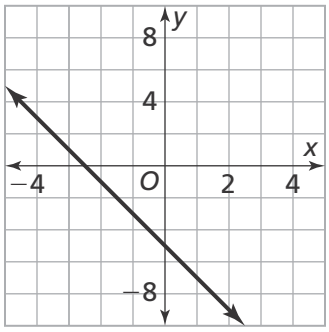
$6.8, 6.\overline{6}, \frac{46}{7}$, and $\sqrt{47}$



8. Abel says $(6^2)^3 = 6^5$. Is he correct? Explain. **2 points**

No; Sample answer: To find the power of a power, multiply the exponents. The correct answer is 6^6.

9. What is the *y*-intercept of the graph? **1 point**



Ⓐ −5

Ⓑ −2.5

Ⓒ 2.5

Ⓓ 5

10. Liam and Evan are mixing paint. Liam uses 2 quarts of yellow paint and adds $3\frac{1}{4}$ jars of blue paint. Evan uses $\frac{1}{2}$ quart of yellow paint and adds $5\frac{1}{2}$ jars of red paint. They end up with the same volume of paint.

Part A

Write an equation to represent the situation. **1 point**

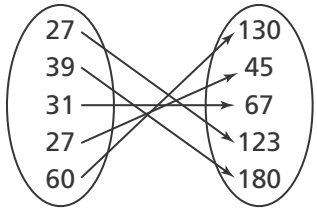
$$2 + 3\frac{1}{4}x = \frac{1}{2} + 5\frac{1}{2}x$$

Part B

What volume of paint did each boy mix? **1 point**

$4\frac{1}{6}$ **quarts**

11. Is the relation shown in the arrow diagram a function? Explain. **2 points**



No; Sample answer: The input 27 has two outputs. In a function, each input has exactly one output.

12. Jason surveyed 90 people on their preference of fruits or vegetables. Complete the two-way frequency table. **1 point**

Type of Food		Age		
		Child	Adult (18+)	Total
	Fruit	26	**26**	**52**
	Vegetable	**14**	24	38
	Total	**40**	**50**	90

13. Use the table in Exercise 12. Which statement is true? Select all that apply. **1 point**

- ☐ More children than adults were surveyed.
- ■ The same number of adults and children prefer fruit.
- ☐ More people prefer vegetables.
- ■ More people prefer fruit.
- ■ More adults than children prefer vegetables.

14. Complete the two-way relative frequency table using the information from Exercise 12. **1 point**

Type of Food		Age		
		Child	Adult (18+)	Total
	Fruit	**28.9%**	28.9%	57.8%
	Vegetable	15.5%	**26.7%**	**42.2%**
	Total	44.4%	55.6%	**100%**

15. Students at a community college were asked a survey question. The two-way frequency table shows the responses from full-time students and part-time students.

Two-Way Frequency Table

	Yes	No	Total
Full-time	67	33	100
Part-time	27	73	100
Total	94	106	200

Is there evidence that responding yes was related to attending the college full-time or part-time? Explain. **2 points**

Yes; Sample answer: The same number of full-time students and part-time students responded to the survey, but the percent of full-time students who responded yes was significantly greater than the percent of part-time students who responded yes.

16. The state fair charges $14 for admission. Each ride costs $6. What is the function that relates the amount spent, S, to the number of rides, r? **1 point**

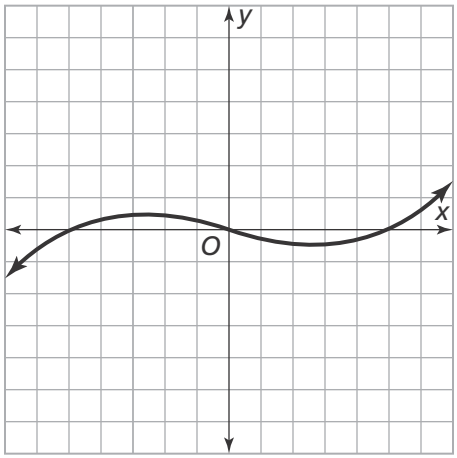
Ⓐ $S = 6r - 14$

Ⓑ $S = 14r - 6$

Ⓒ $S = 6r + 14$

Ⓓ $S = 14r + 6$

17. Does the graph represent a function? Explain. **2 points**



Yes; Sample answer: For each input value, *x*, there is exactly one output value, *y*.

18. The data in the table below represent a linear relationship. Fill in the missing data. **1 point**

x	0	10	20	**30**	40
y	5	12.5	**20**	27.5	**35**

19. Write a function in the form $y = mx + b$ for the line that contains the points $(-6.4, -2.6)$ and $(5.2, 9)$. **1 point**

$y = x + 3.8$

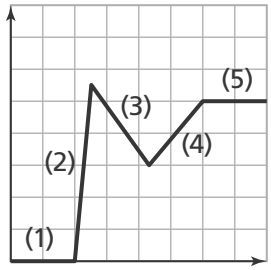
20. Kylie recorded the number of squats she could do on each day of her training.

Day	1	2	3	4
Number of Squats	10	12	15	19

Is the relation a function? Explain. **2 points**

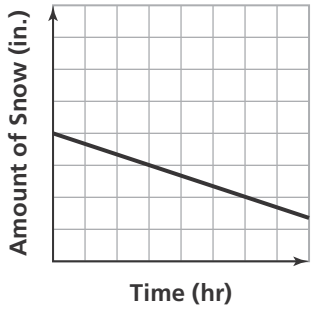
Yes; Sample answer: Each input (day) has exactly one output (number of squats).

21. In which interval is the function increasing? Select all that apply. **1 point**



- ☐ Interval 1
- ■ Interval 2
- ☐ Interval 3
- ■ Interval 4
- ☐ Interval 5

22. The graph shows the amount of snow on the ground on one day. Describe the behavior of the function. **1 point**



Sample answer: As time increases, the level of snow decreases.

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23. Madeline studies math between 1 and 8 hours per week. She wants to determine if there is a relationship between time spent studying and her exam scores. She decides to construct a scatter plot to show the data. What scales could Madeline use for the *x*- and *y*-axes? **2 points**

Sample answer: For the *x*-axis (hours studied), she could use a scale of 0–10 with major tick marks for each even number. For the *y*-axis (test scores), she could use a scale of 0 to 100 with major tick marks every 10 and minor tick marks every 5.

24. The equation $y = 3x - 6$ and the table shown below describe two different linear functions.

x	*y*
1	5.5
2	9
3	12.5
4	16

Which function has the greatest rate of change? Explain. **2 points**

The function in the table; Sample answer: The function in the table has a slope of 3.5; the function in the equation has a slope of 3.

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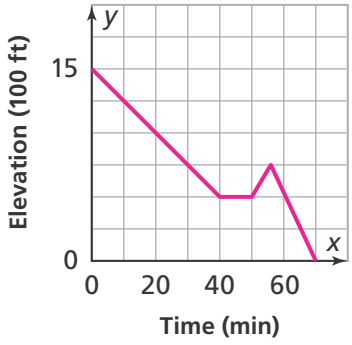
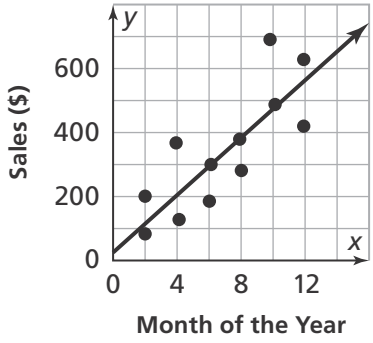
25. Wylie climbs steadily down a trail that is 1,500 feet above sea level for 40 minutes. Then he takes a 10-minute lunch break. After lunch, Wylie climbs back up the trail for 5 minutes to take a picture. Finally, he hikes for 15 minutes until he reaches sea level. Sketch a graph that represents this description. **1 point**



26. Which best describes the linear association shown in the scatter plot? **1 point**



Ⓐ Strong positive

Ⓑ Weak positive

Ⓒ Strong negative

Ⓓ Weak negative

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27. An equation of a trend line for the scatter plot in Question 26 above is $y = 42x + 50$. Predict how many more sales the store makes in December than in November. **1 point**

Sample answer: The store will make 42 more sales in December than in November.

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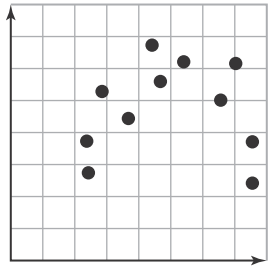
28. Describe the association between the two sets of data in the scatter plot. **1 point**



Nonlinear association

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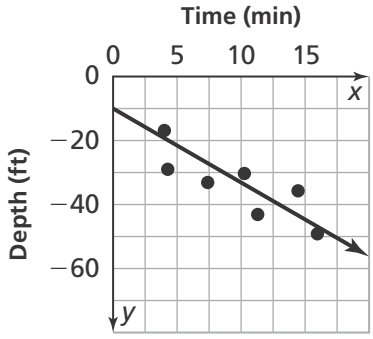
29. The scatter plot shows a scuba diver's depth in the ocean. The equation of the trend line shown is $y = -3.29x - 10$. Predict what the diver's depth will be after 30 minutes. **1 point**



108.7 feet below sea level

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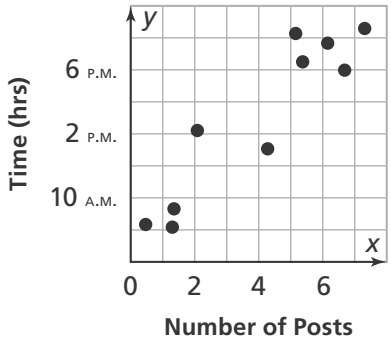
30. The scatter plot below shows the number of online posts Evie makes per day and the time at which she makes them. Identify any clusters in the scatter plot. **1 point**



Sample answer: There are two clusters. One cluster is between 8 A.M. and 10 A.M. and another cluster is between 6 P.M. and 8 P.M.