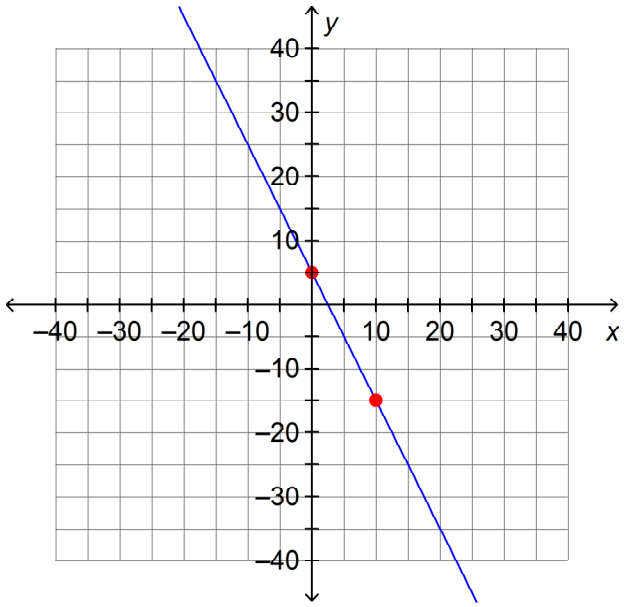
Name: _____ **Class:** _____ **Date:** _____ **ID: A**

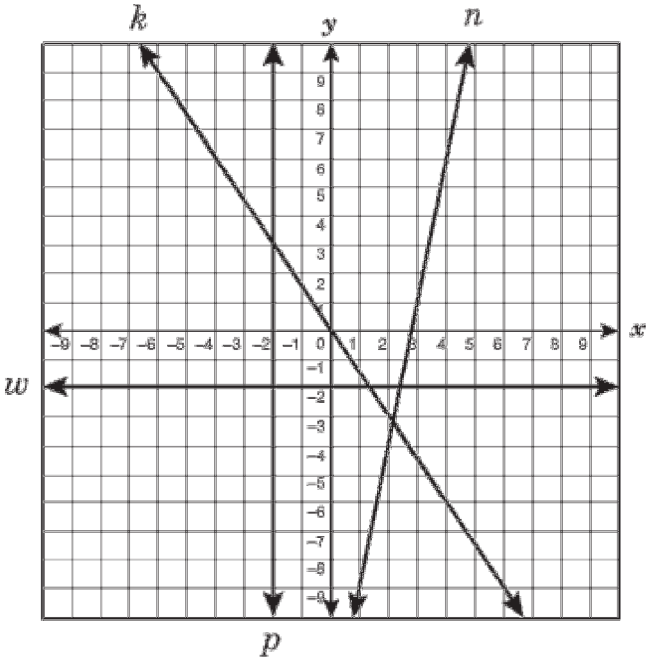
Unit 5 SAMPLE TEST - Proportional Relationships and Defining Linear Functions

1. What is the slope of the line shown below?



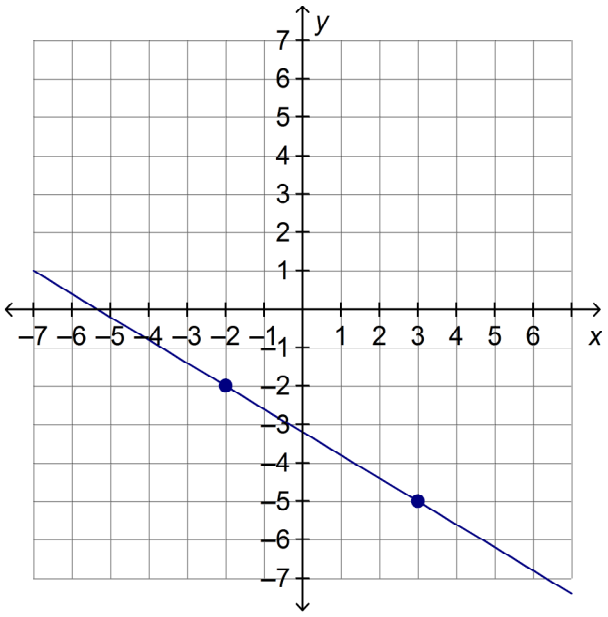
a. –4
b. –2
c. 3
d. 2

2. Which line appears to have a slope of zero?

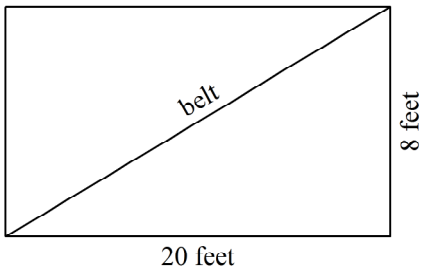


a. Line *k*
b. Line *n*
c. Line *p*
d. Line *w*

3. What is the slope of the line shown in the graph? Show your work.



4. A conveyor belt runs between floors of a building as pictured below. Find the slope of the belt as a positive number.



a. undefined
c. $\frac{2}{5}$
b. $\frac{5}{2}$
d. 0

Find the slope of the line that passes through the pair of points.

5. (–3, –2), (5, 4)

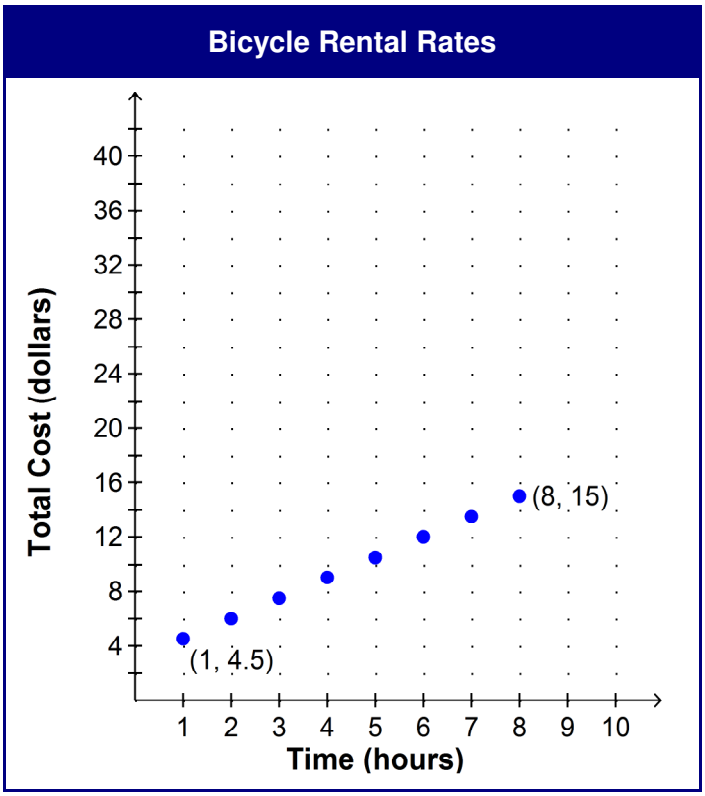
a. $\frac{3}{4}$
c. $-\frac{3}{4}$
b. $\frac{4}{3}$
d. $-\frac{4}{3}$

6. The table shows the net profit of a traveling theater group based on how many tickets are sold at each stop. Suppose you were to plot the data on a coordinate grid with the number of tickets sold along the *x*-axis and the net profit along the *y*-axis. What would the slope of the line passing through the data points be? Be sure to include the appropriate units for the slope.

Performing Arts Group	
Tickets Sold (*x*)	**Net Profit (*y*)**
200	$400.00
250	$800.00
300	$1,200.00

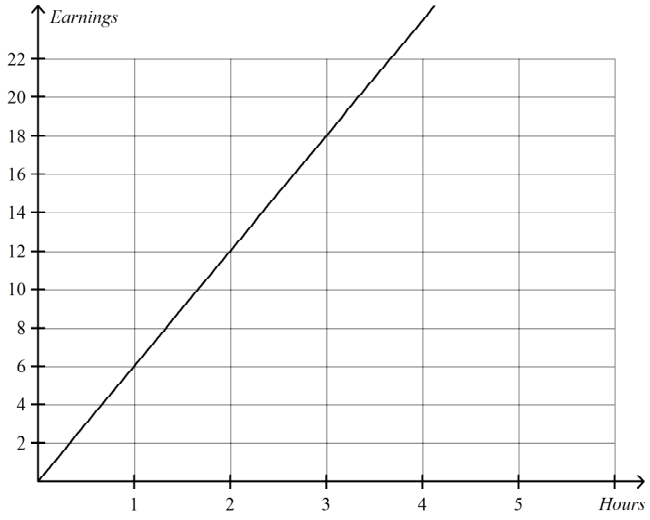
a. $2.75 per ticket sold
b. 8 tickets per dollar earned
c. $8.00 per ticket sold
d. 3 tickets per dollar earned

7. A bicycle rental company charges customers a deposit of $3.00 plus an hourly rate as shown in the graph. What is the slope of the line joining these points, and what does the slope represent?



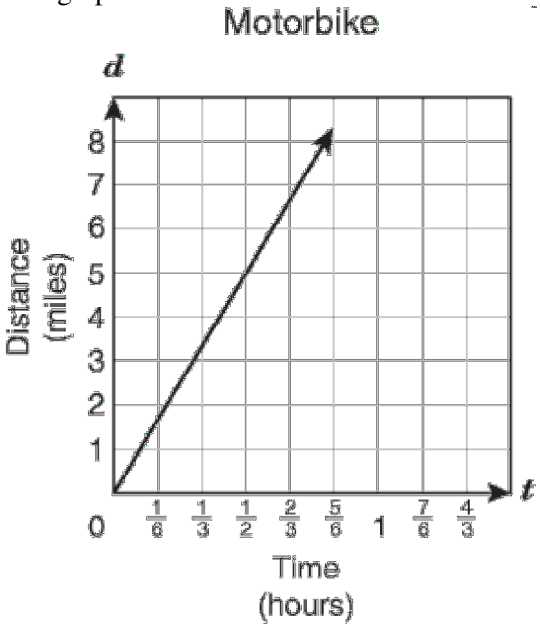
a. The slope is 1.5. This means that a customer used the bicycle for 1.5 hours.
b. The slope is 3. This represents the deposit of $3.00.
c. The slope is 1.5. This represents the rental charge of $1.50 per hour.
d. The slope is 3. This represents the rental charge of $3.00 per hour.

8. The amount of money that Justin earns is directly proportional to the number of hours that he works. How much does Justin earn per hour?



a. $0.50 per hour
b. $6 per hour
c. $7
d. $12 per hour

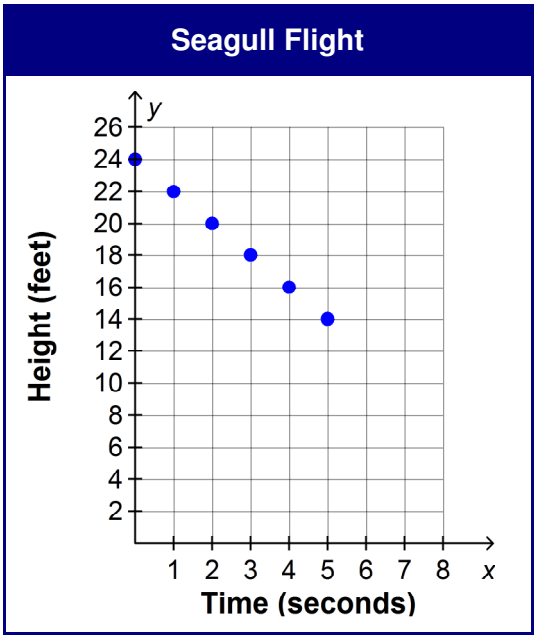
9. The graph shows the distance a certain motorbike can travel at a constant speed with respect to time.



Which of the following best describes the meaning of the slope of the line representing this situation?

a. The motorbike travels at a speed of about 8 miles per hour.
b. The motorbike travels at a speed of about 2.5 miles per hour.
c. The motorbike travels at a speed of about 5 miles per hour.
d. The motorbike travels at a speed of about 10 miles per hour.

A seagull's height above the ground is shown at certain times as the bird glides in to land on a pier from an initial height of 24 feet.

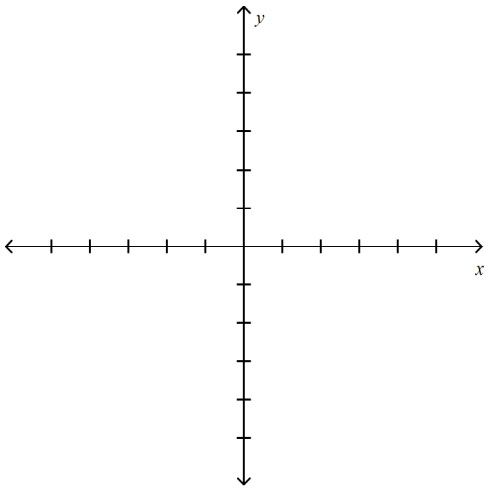


10. Refer to the information above. If the seagull continues to descend at a constant rate, how long will it take for the bird to land on the pier? (Hint: when the seagull lands on the pier, its height will be 0 feet above the ground.)
    a. 14 seconds
    b. 5 seconds
    c. 12 seconds
    d. 24 seconds

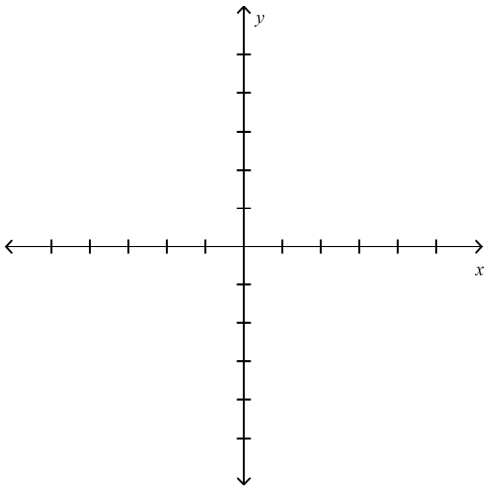
11. The dimensions of a building are 300 meters by 100 meters. If one centimeter represents 5 meters on a scale architecture drawing, what are the dimensions of the building on the drawing?
    a. 60 centimeters by 20 centimeters
    b. 6 centimeters by 2 centimeters
    c. 3 centimeters by 1 centimeters
    d. 120 centimeters by 40 centimeters

For questions graph the proportional relationship between the two quantities, write the equation representing the relationship (y = mx)**, and describe how the unit rate, or slope is represented on the graph.** (Hint: Start by creating a table.)

12. Jenna rides her bike at 12 mph.



13. The Dry Cleaners charges $13.00 to clean and press two jackets.



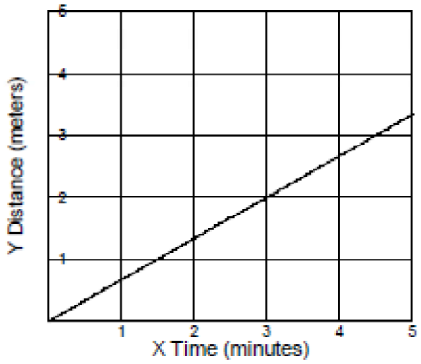
14. Put the cyclists in order from slowest to fastest. x represents time in minutes and y represents meters traveled.

a)

Time	Meters
2	1
4	2
6	3

b) $y = \frac{1}{3}x$

c)



d) Bob has cycled 12 meters in the past 6 minutes.

a. a, b, c, d
b. b, a, c, d
c. c, d, b, a
d. d, c, a, b

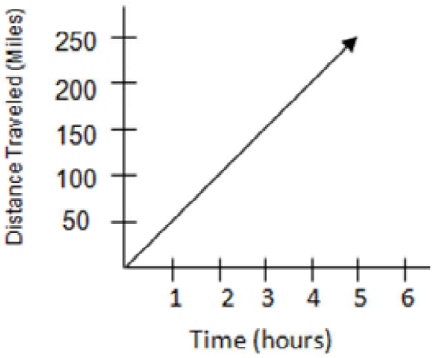
15. Among Colton, Robin, Ashley, and Jamie: Who drove the fastest?

Colton

Hours	Miles
2	90
3	135
4	180

Robin
y = 55x

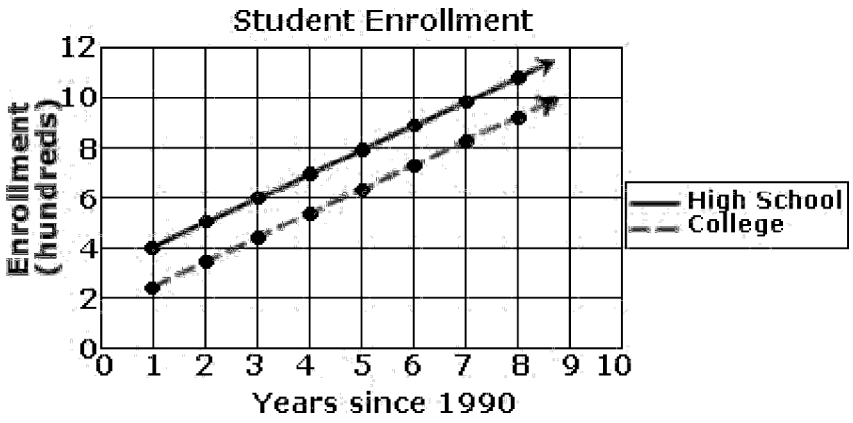
Ashley



Jamie
In 4 hours, Jamie traveled 240 miles.

a. Colton
b. Robin
c. Ashley
d. Robin

16. Which of the following statements is true given the graph below?



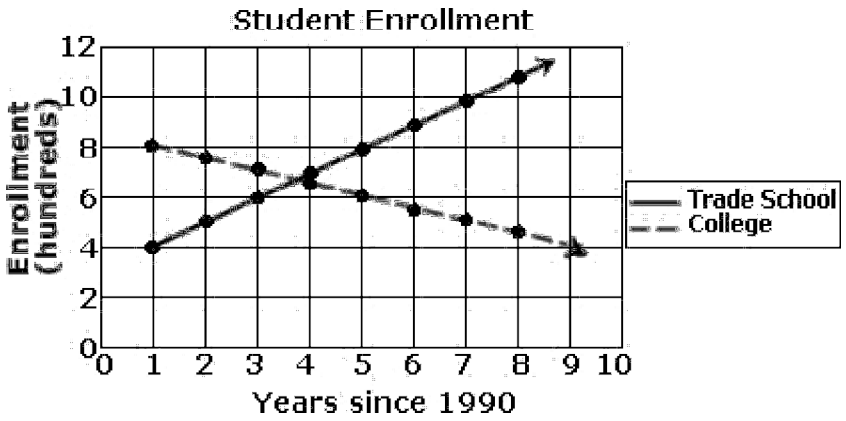
a. The rate of increasing enrollment is the same for high school as college because the slopes are the same.

b. The rate of increasing enrollment is the same for high school as college because of the overlapping time period.

c. The rate of increasing enrollment is greater for high school than college because the slopes are the same.

d. The rate of increasing enrollment is greater for high school than college because high school enrollment is always greater than college.

17. Which of the following statements is true given the graph below?



a. The rate of increasing enrollment for trade school is the same as the rate of decreasing enrollment in college because the slopes are reciprocals of each other.

b. The rate of increasing enrollment for trade school is greater than the rate of decreasing college enrollment because the slopes are reciprocals of each other.

c. The rate of increasing enrollment for trade school is greater than the rate of decreasing enrollment in college because the slope of the trade school enrollment is steeper than the slope of college enrollment.

d. The rate of increasing enrollment is greater for trade school than the decreasing rate of college enrollment because trade school enrollment is always greater than college enrollment.

Write an equation of the line with the given slope and y-intercept

18. slope: $\frac{2}{7}$, y-intercept: –3

a. $y = -\frac{2}{7}x - 3$

b. $y = \frac{7}{2}x - 3$

c. $y = \frac{2}{7}x + 3$

d. $y = \frac{2}{7}x - 3$

Write the equation in slope-intercept form.

19. $y + 3 = 3(x - 1)$

a. $y = -3x - 6$

b. $y = 3x - 6$

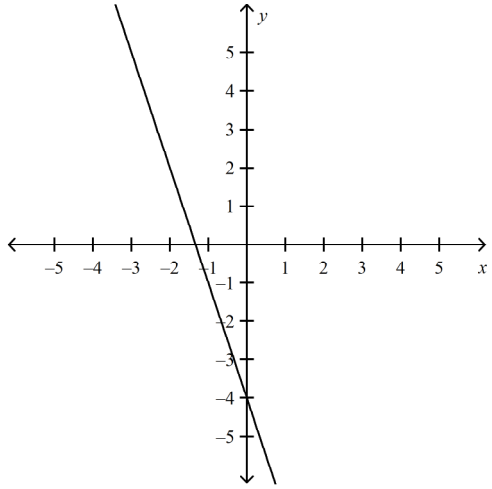
c. $y = 3x + 4$

d. $y = 3x + 6$

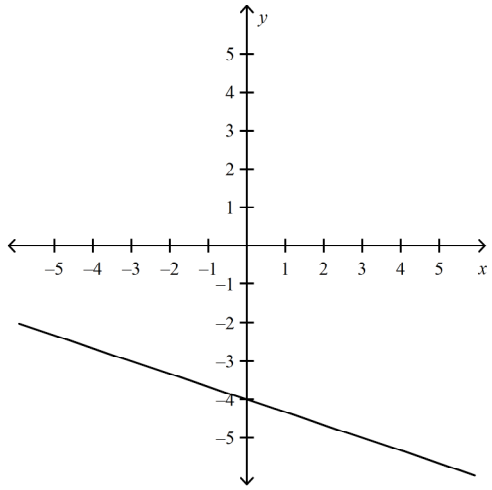
Graph the function.

20. $y = -\frac{1}{3}x - 4$

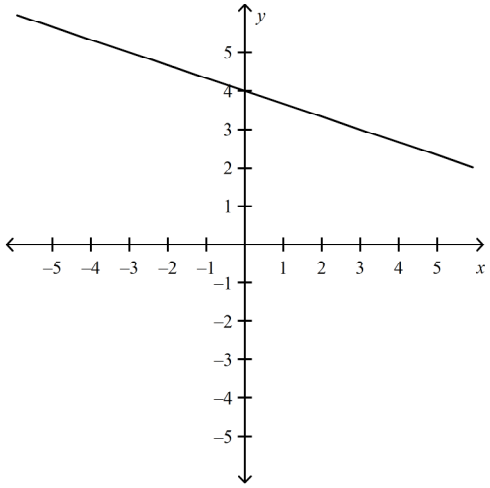
a.



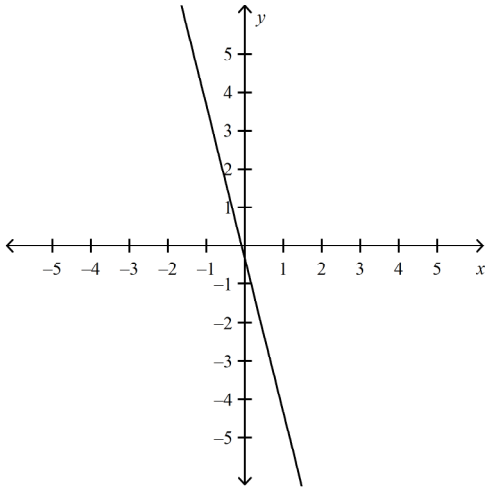
b.



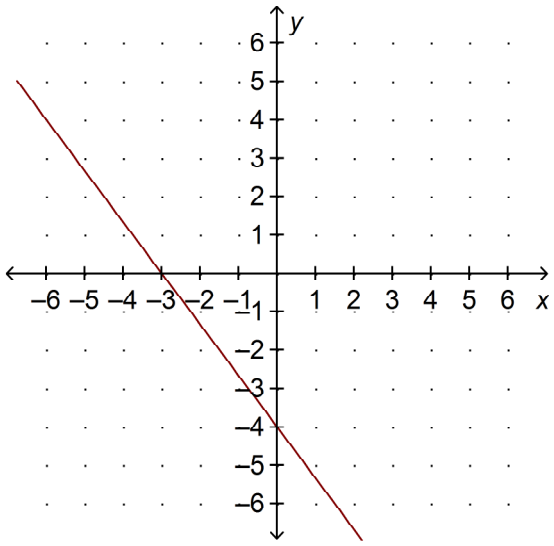
c.



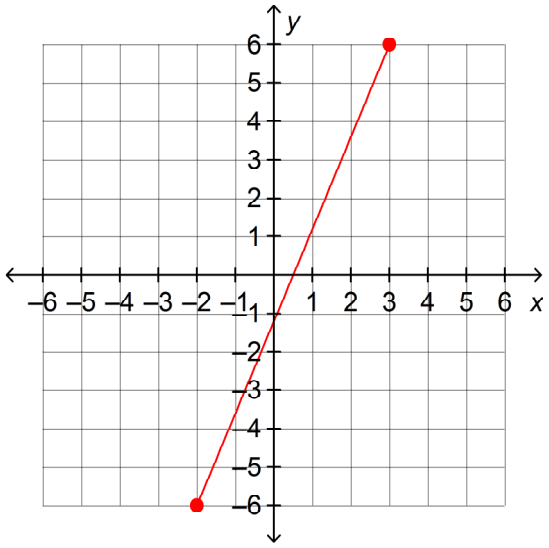
d.



21. What are the coordinates of the *x*-intercept and the *y*-intercept of the line graphed below? Explain.



22. Which of the following equations represents a line segment that is **perfectly** to the segment in the graph?



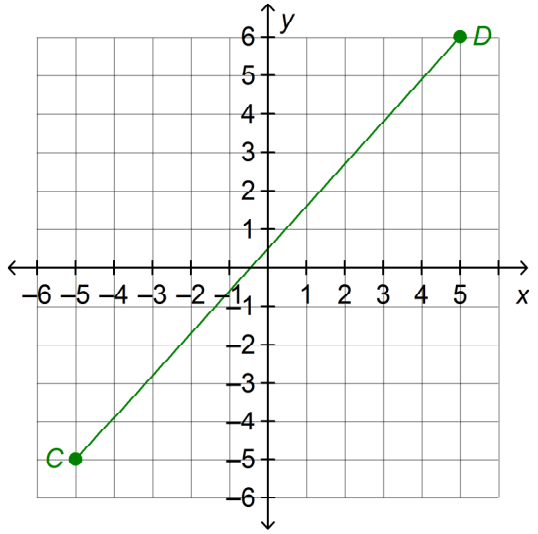
a. $y = -\frac{1}{6}x$

b. $y = \frac{5}{12}x - 6$

c. $y = -\frac{5}{12}x + 5$

d. $y = \frac{12}{5}x + 7$

23. The segment below has endpoints (–5, –5) and (5, 6). What is the slope of a line segment that is **parallel** to $\overline{CD}$?



a. $\frac{11}{20}$

b. $\frac{11}{10}$

c. $-\frac{10}{11}$

d. $-\frac{11}{10}$

24. Which equation represents a linear function?

Equation 1: $xy = 9$

Equation 2: $y = 7x + 8$

Equation 3: $y = 3x^2 - 1$

Equation 4: $y = \frac{4}{x}$

a. Equation 1

b. Equation 2

c. Equation 3

d. Equation 4

25. Which of these graphs represents a linear function?

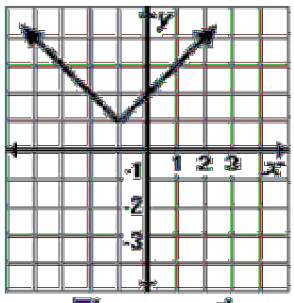


Figure 1

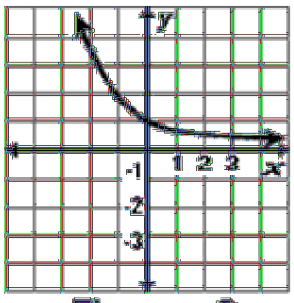


Figure 2

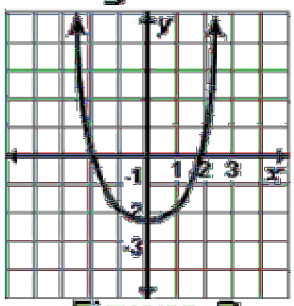


Figure 3

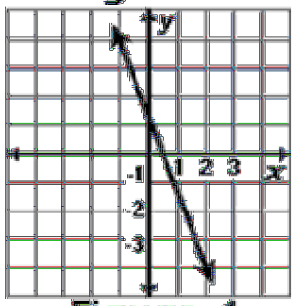


Figure 4

a. Figure 1
b. Figure 2
c. Figure 3
d. Figure 4

26. Which table represents a nonlinear function?

Table A

x	-1	0	1	2
y	5	7	9	11

Table C

x	-5	0	5	10
y	1	3	7	15

Table B

x	5	9	13	17
y	-6	-4	-2	0

Table D

x	6	4	2	0
y	1	5	9	13

a. Table A
b. Table B
c. Table C
d. Table D

Unit 5 SAMPLE TEST - Proportional Relationships and Defining Linear Functions
Answer Section

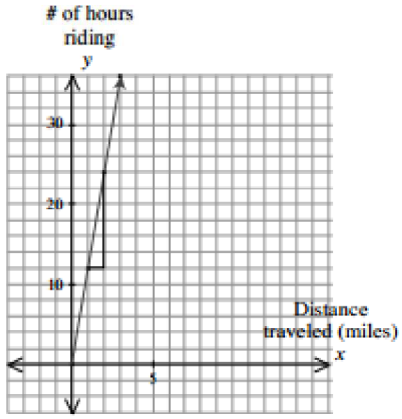
1. ANS: B NAT: 8: 8.EE.5 STA: 8: 8.EE.5
2. ANS: D
3. ANS:
   Note: The following is only a sample answer. All reasonable answers should be accepted.

   $-\frac{3}{5}$

   The two points on the graph have coordinates (–2, –2) and (3, –5). Use these points to calculate the slope.

   $m = \frac{-5-(-2)}{3-(-2)} = -\frac{3}{5}$

   NAT: 8: 8.EE.5 STA: 8: 8.EE.5
4. ANS: C NAT: NA 2 | NA 4 | NA 7 | NA 10 | NA 3
   STA: 3.4PO2
5. ANS: A STA: 3.4PO1
6. ANS: C NAT: 8: 8.EE.5 STA: 8: 8.EE.5
7. ANS: C NAT: 8: 8.F.3 STA: 8: 8.F.3
8. ANS: B NAT: G8-FP1 | G8-FP5C
9. ANS: D
10. ANS: C STA: 8: 3.1.PO 1
11. ANS: A NAT: 8: 8.EE.5 STA: 8: 8.EE.5
12. ANS:



Equation: y = 12x
where x is the number of hours of riding, and y is the number of miles she has traveled. This is a proportional relationship: it passes through the origin, and if the number of hours is doubled or tripled, the distance Jenna travels is also doubled or tripled.
The graph contains a slope triangle (not needed).
The slope, or unit change, is $\frac{\text{rise}}{\text{run}} = \frac{12}{1}$ or simply 12

13. ANS:
    The graph of $y = 6.5x$, which is a line passing through (0, 0) with a slope of 6.5;
    the slope 6.5 is the unit rate of each jacket. So, it's $6.50 to dry clean per jacket.
14. ANS: B
15. ANS: D
16. ANS: A
17. ANS: C
18. ANS: D NAT: NA 2 | NA 8 | NA 9 | NA 10 | NA 4
    STA: 3.3PO3
19. ANS: B NAT: NA 2 | NA 8 | NA 9 | NA 10 | NA 6
    STA: 3.3PO3
20. ANS: B NAT: G8-FP1 | G8-FP5C STA: 3.2PO1 | 3.2PO2 | 4.3PO1
21. ANS:
    Note: The following is only a sample answer. All reasonable answers should be accepted.

    x-intercept (–3, 0); *y*-intercept (0, –4)

    The line intersects the *x*-axis at $x = -3$, so the *x*-intercept is (–3, 0). It intersects the *y*-axis at $y = -4$, so the *y*-intercept is (0, –4).

    STA: 8: 3.4.PO 1
22. ANS: C NAT: 8: 8.F.3 STA: 8: 8.F.3
23. ANS: B NAT: 8: 8.F.3 STA: 8: 8.F.3
24. ANS: B
25. ANS: D
26. ANS: C