

## Chapter 1 Quiz Part 2

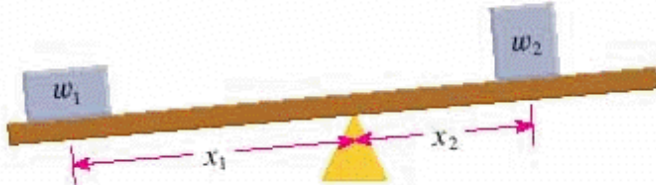
### Multiple Choice

Identify the choice that best completes the statement or answers the question.

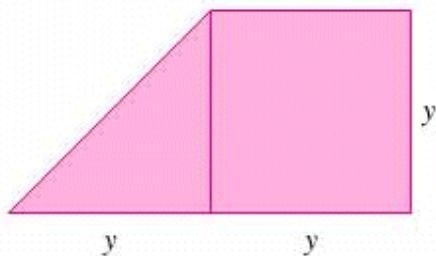
- \_\_\_\_\_ 1. Express the concentration (in oz/gal) of salt in a mixture of 4 gallons of brine containing 23 ounces of salt, to which some pure water has been added, where  $x$  = volume of pure water added (in gallons).
- $\frac{23}{4+x}$
  - none of these
  - $\frac{23}{4-x}$
  - $\frac{4}{23+x}$
  - $\frac{23}{x}$
- \_\_\_\_\_ 2. Helen earns \$7.50 per hour at her job, but if she works more than 35 hours in a week she is paid  $1\frac{1}{2}$  times her regular wage for the overtime hours worked. One week her gross pay was \$296.25. How many overtime hours did she work that week?
- 7 hours
  - none of these
  - 4 hours
  - 3 hours
  - 2 hours
- \_\_\_\_\_ 3. The figure shows a lever system, similar to a seesaw that you might find in a children's playground. For the system to balance, the product of the weight and its distance from the fulcrum must be the same on each side; that is

$$x_1 w_1 = x_2 w_2.$$

This equation is called the **law of the lever**, and was first discovered by Archimedes. A woman and her son are playing on a seesaw. The boy is at one end, 16 ft from the fulcrum. If the son weighs 80 lb and the mother weighs 135 lb, where should the woman sit so that the seesaw is balanced?



- 27.0 ft
  - 16.0 ft
  - 10.5 ft
  - 9.5 ft
  - 12.5 ft
- \_\_\_\_\_ 4. Find the length  $y$  in the figure, if the shaded area is  $96 \text{ in}^2$ .

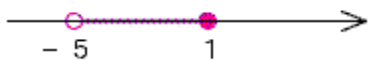


- a. 8 in.
- b. 9.80 in.
- c. 48.00 in.
- d. 11.31 in.
- e. 9 in.

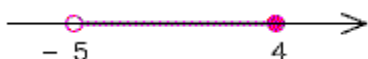
5. A merchant blends tea that sells for \$2.85 per pound with tea that sells for \$2.60 per pound to produce 90 lb of a mixture that sells for \$2.75 per pound. How many pounds of each type of tea does the merchant use in the blend?
- a. 36 lb of tea that sells for \$2.85 per pound and 54 lb of tea that sells for \$2.60 per pound.
  - b. none of these
  - c. 54 lb of tea that sells for \$2.85 per pound and 27 lb of tea that sells for \$2.60 per pound.
  - d. 54 lb of tea that sells for \$2.85 per pound and 36 lb of tea that sells for \$2.60 per pound.
  - e. 45 lb of tea that sells for \$2.85 per pound and 45 lb of tea that sells for \$2.60 per pound.
6. Solve the linear inequality. Express the solution using interval notation and graph the solution set.

$$-1 < 2x + 5 \leq 11$$

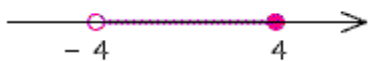
- a. Interval:  $(-5, 1]$ . Graph:



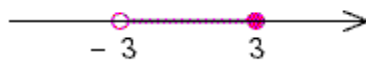
- b. Interval:  $(-5, 4]$ . Graph:



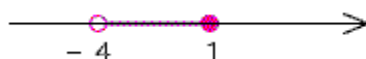
- c. Interval:  $(-4, 4]$ . Graph:



- d. Interval:  $(-3, 3]$ . Graph:



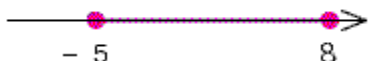
- e. Interval:  $(-4, 1]$ . Graph:



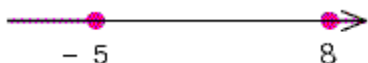
7. Solve the nonlinear inequality. Express the solution using interval notation and graph the solution set.

$$x^2 - 2x - 24 \leq 0$$

- a. Solution:  $[-5, 8]$  Graph:

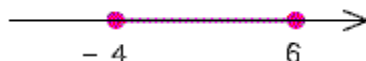


- b. Solution:  $(-\infty, -5] \cup [8, \infty)$  Graph:

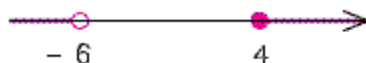


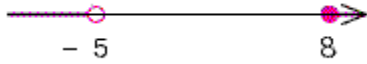
- c. Solution:  $(-\infty, -5) \cup [8, \infty)$  Graph:

- d. Solution:  $[-4, 6]$  Graph:



- e. Solution:  $(-\infty, -6) \cup [4, \infty)$  Graph:

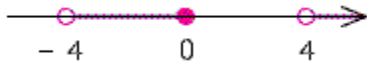




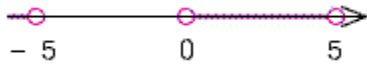
8. Solve the nonlinear inequality. Express the solution using interval notation and graph the solution set.

$$x^3 - 9x > 0$$

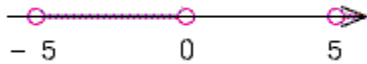
a. Solution:  $(-4, 0] \cup (4, \infty)$  Graph:



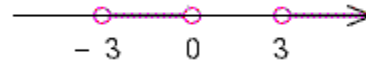
b. Solution:  $(-\infty, -5) \cup (0, 5)$  Graph:



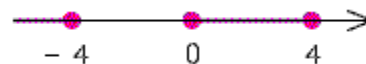
c. Solution:  $(-5, 0) \cup (5, \infty)$  Graph:



d. Solution:  $(-3, 0) \cup (3, \infty)$  Graph:



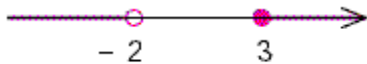
e. Solution:  $(-\infty, -4] \cup [0, 4]$  Graph:



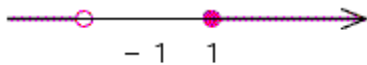
9. Solve the nonlinear inequality. Express the solution using interval notation and graph the solution set.

$$\frac{x-3}{x+2} \geq 0$$

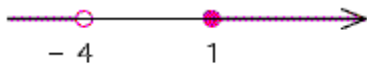
a. Interval:  $(-\infty, -2) \cup [3, \infty)$  Graph:



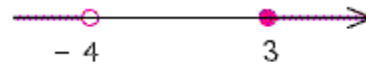
b. Interval:  $(-\infty, -1) \cup [1, \infty)$  Graph:



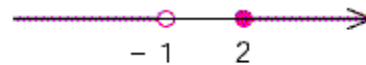
c. Interval:  $(-\infty, -4) \cup [1, \infty)$  Graph:



d. Interval:  $(-\infty, -4) \cup [3, \infty)$  Graph:



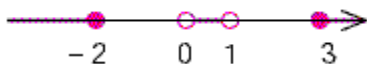
e. Interval:  $(-\infty, -1) \cup [2, \infty)$  Graph:



10. Solve the nonlinear inequality. Express the solution using interval notation and graph the solution set.

$$\frac{3}{x-1} - \frac{4}{x} \geq 1$$

a. Interval:  $(-\infty, -2] \cup (0, 1) \cup [3, \infty)$  Graph:

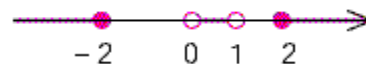


b. Interval:  $(-\infty, -3] \cup (0, 1) \cup [3, \infty)$  Graph:

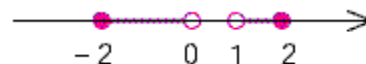


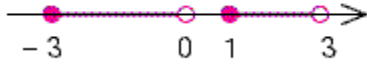
c. Interval:  $[-3, 0) \cup [1, 3)$  Graph:

d. Interval:  $(-\infty, -2] \cup (0, 1) \cup [2, \infty)$  Graph:



e. Interval:  $[-2, 0) \cup (1, 2]$  Graph:

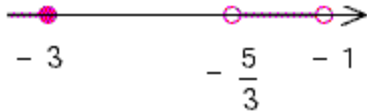




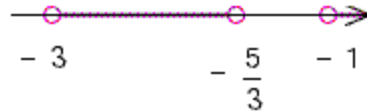
11. Solve the nonlinear inequality. Express the solution using interval notation and graph the solution set.

$$\frac{1}{x+1} + \frac{2}{x+3} \leq 0$$

a. Interval:  $(-\infty, -3) \cup \left[-\frac{5}{3}, -1\right)$  Graph:



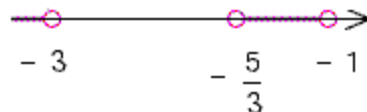
d. Interval:  $\left(-3, -\frac{5}{3}\right) \cup [-1, \infty)$  Graph:



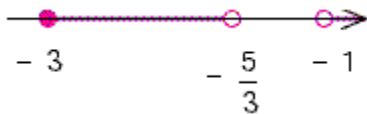
b. Interval:  $(-\infty, -3) \cup \left[-\frac{5}{3}, -1\right)$  Graph:



e. Interval:  $(-\infty, -3) \cup \left[-\frac{5}{3}, -1\right)$  Graph:



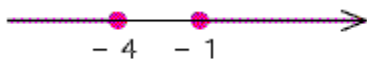
c. Interval:  $\left(-3, -\frac{5}{3}\right) \cup [-1, \infty)$  Graph:



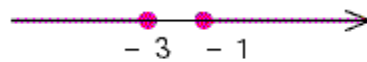
12. Solve the absolute value inequality. Express the answer using interval notation and graph the solution set.

$$|x+2| \geq 1$$

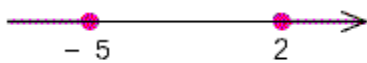
a. Interval:  $(-\infty, -4] \cup [-1, \infty)$ . Graph:



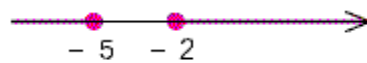
d. Interval:  $(-\infty, -3] \cup [-1, \infty)$ . Graph:



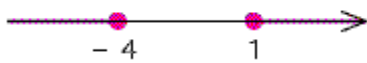
b. Interval:  $(-\infty, -5] \cup [2, \infty)$ . Graph:



e. Interval:  $(-\infty, -5] \cup [-2, \infty)$ . Graph:



c. Interval:  $(-\infty, -4] \cup [1, \infty)$ . Graph:



13. Solve the inequality. Express the solution using interval notation.

$$5x + 24 < 9.$$

a.  $x \in (-\infty, 3)$

b.  $x \in (-3, \infty)$

c.  $x \in (-\infty, -3)$

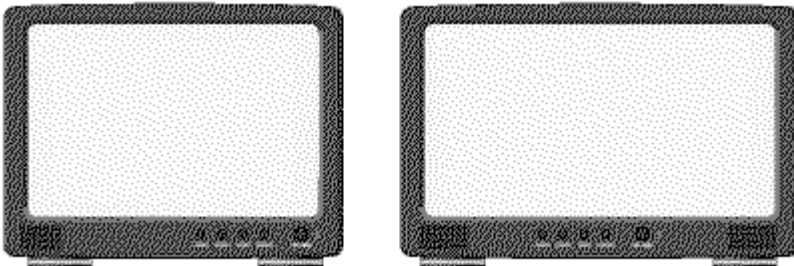
d.  $x \in (-\infty, -7)$

e.  $x \in (-\infty, 7]$

- \_\_\_ 14. In the vicinity of a bonfire, the temperature  $T$  in  $^{\circ}\text{C}$  at a distance of  $x$  meters from the center of the fire was given by

$$T = \frac{762,500}{x^2 + 300}.$$

At what range of distances from the fire's center was the temperature less than  $500^{\circ}\text{C}$ ?



- a. More than 45 meters  
 b. More than 20 meters  
 c. More than 30 meters  
 d. More than 35 meters  
 e. More than 25 meters
- \_\_\_ 15. Solve the inequality. Express the solution using interval notation.

$$20 - 4x \leq -16.$$

- a.  $x \in (-\infty, 9)$   
 b.  $x \in [9, \infty)$   
 c.  $x \in (-\infty, -3)$   
 d.  $x \in (-9, \infty)$   
 e.  $x \in (-\infty, 3]$

- \_\_\_ 16. Solve the inequality. Express the solution using interval notation.

$$4 < 4x + 8 \leq 40.$$

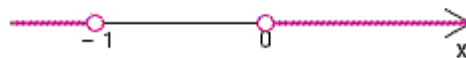
- a.  $[0, 1]$   
 b.  $(-1, 0]$   
 c.  $[-1, 2)$   
 d.  $(-1, 2]$   
 e.  $(-1, 8]$

- \_\_\_ 17. Solve the nonlinear inequality. Express the solution using interval notation and graph the solution set.

$$\frac{x}{x+1} > 3x$$

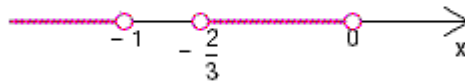
a.

$$(-\infty, -1) \cup (0, \infty);$$



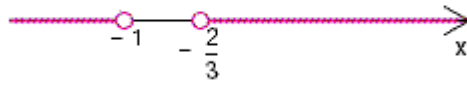
b.

$$(-\infty, -1) \cup \left(-\frac{2}{3}, 0\right];$$



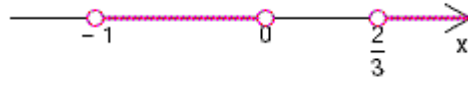
c.

$$(-\infty, -1) \cup \left(-\frac{2}{3}, \infty\right);$$



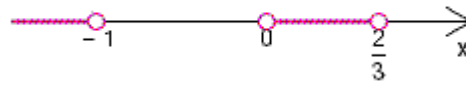
d.

$$(-1, 0) \cup \left(\frac{2}{3}, \infty\right);$$



e.

$$(-\infty, -1) \cup \left(0, \frac{2}{3}\right);$$



\_\_\_ 18. Solve the inequality. Express the answer using interval notation.

$$5|x + 2| + 9 > 8$$

a. Interval:  $(-\infty, -1) \cup (1, \infty)$

b. Interval:  $(-\infty, \infty)$

c. Interval:  $[1.80, \infty)$

d.  $\emptyset$

e. Interval:  $(-\infty, -17) \cup (17, \infty)$

\_\_\_ 19. A phrase describing set of real numbers is given. Express the phrase as an inequality involving an absolute value.

All real numbers  $x$  at least 3 units from 4

a.  $|x - 4| < 3$

b.  $|x - 4| \leq 3$

c.  $|x - 3| > 4$

d.  $|x - 4| \geq 3$

e.  $|x - 4| > 3$

\_\_\_ 20. Determine the values of the variable for which the expression is defined as a real number.

$$\left(\frac{1}{x^2 - x - 20}\right)^{\frac{1}{2}}$$

a.  $(-\infty, -4) \cup (4, \infty)$

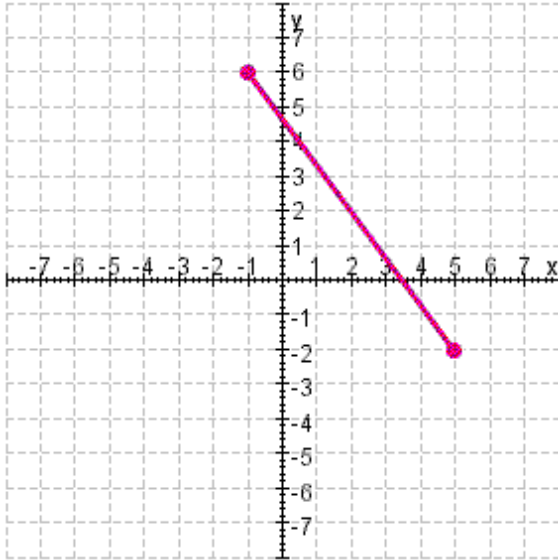
b.  $(-\infty, -3) \cup (4, \infty)$

c.  $(-\infty, -3) \cup (5, \infty)$

d.  $(-\infty, -2) \cup (3, \infty)$

e.  $(-\infty, -4) \cup (5, \infty)$

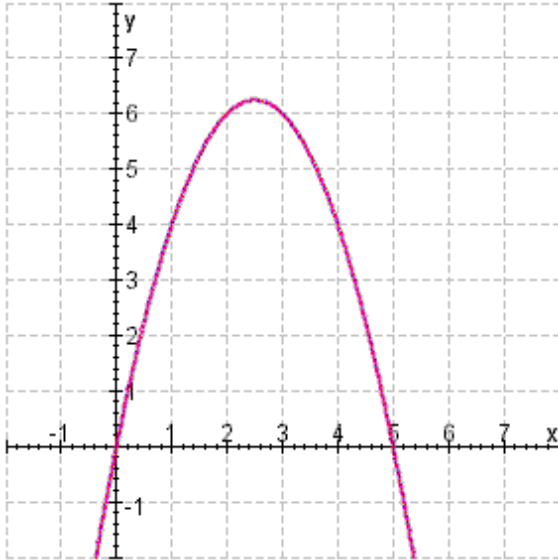
\_\_\_ 21. A pair of points is graphed.



Find the midpoint of the segment that joins them.

- a. (2, 3)
  - b. (1, 0)
  - c. (2, 2)
  - d. (3, 2)
  - e. (3, 3)
- \_\_\_ 22. The parallelogram has the vertices of  $A(3, 4)$ ,  $B(9, 4)$ ,  $C(10, 6)$ , and  $D(4, 6)$  on a coordinate plane. Find the area of the parallelogram.
- a. 12
  - b. 10
  - c. 11
  - d. 13
  - e. 14
- \_\_\_ 23. Find a point on the  $y$ -axis that is equidistant from the points  $(1, -7)$  and  $(5, -1)$ .
- a.  $(-2, 0)$
  - b.  $(0, -2)$
  - c.  $(0, 0)$
  - d.  $(0, 3)$
  - e.  $(0, -4)$
- \_\_\_ 24. The parallelogram has vertices of  $A(-4, -2)$ ,  $B(2, 0)$ ,  $C(5, 5)$ , and  $D(-1, 3)$ . Find the midpoints of the diagonals of this parallelogram.
- a.  $(1, 0)$ ,  $(-1, 0)$
  - b.  $(1, 1)$ ,  $(1, 1)$
  - c.  $(0.5, 1.5)$ ,  $(0.5, 1.5)$
  - d.  $(1, 1)$ ,  $(0.5, 1.5)$
  - e.  $(0, 0.5)$ ,  $(0, 0.5)$
- \_\_\_ 25. An equation and its graph are given. Find the  $x$ -intercepts.

$$y = 5x - x^2$$

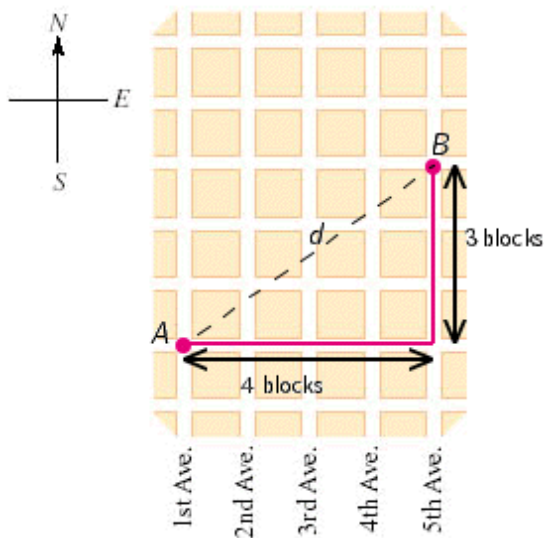


- a. 0, 1
- b. 0
- c. 5
- d. 1
- e. 0, 5

26. Find the area of the region that lies outside of the circle  $x^2 + y^2 = 9$  but inside of the circle  $x^2 + y^2 - 2y = 48$  to two decimal places.

- a. 136.66
- b. 126.66
- c. 128.66
- d. 125.66
- e. 135.66

27. A city has streets that run north and south, and avenues that run east and west, all equally spaced. Streets and avenues are numbered sequentially, as shown in the figure. The walking distance between points  $A$  and  $B$  is 7 blocks; that is, 4 blocks east and 3 blocks north. To find the straight-line distances  $d$ , we must use the Distance Formula.



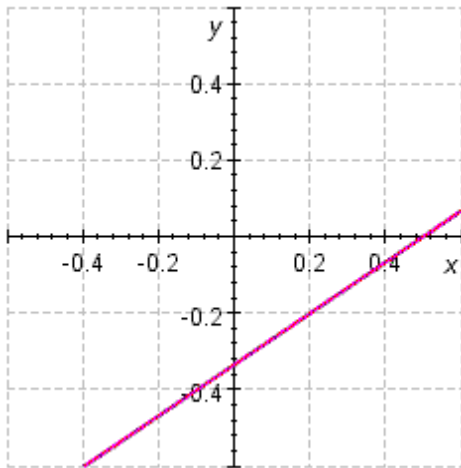
Find the walking distance and the straight-line distance between the corner of 4th St. and 2nd Ave. and the corner of 9th St. and 14th Ave.

- The walking distance is 17 blocks and the straight-line distance is 14 blocks.
- The walking distance is 16 blocks and the straight-line distance is 14 blocks.
- The walking distance is 19 blocks and the straight-line distance is 15 blocks.
- The walking distance is 16 blocks and the straight-line distance is 13 blocks.
- The walking distance is 17 blocks and the straight-line distance is 13 blocks.

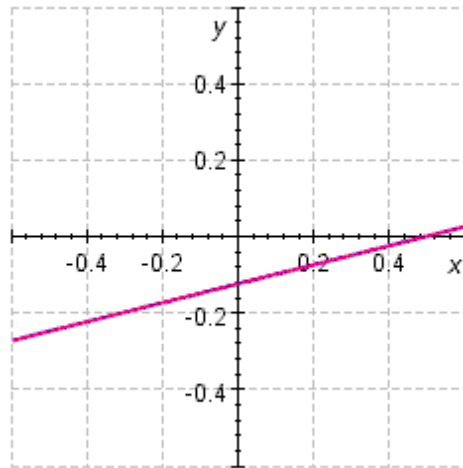
28. Find the slope and y-intercept of the line and draw its graph.

$$2x + 3y - 1 = 0$$

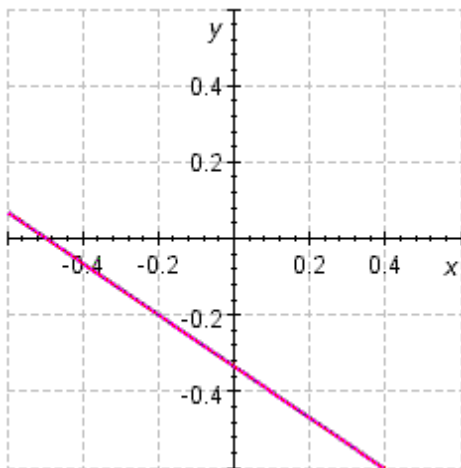
- a. The slope is  $\frac{2}{3}$ , and the y-intercept is  $-\frac{1}{3}$ .



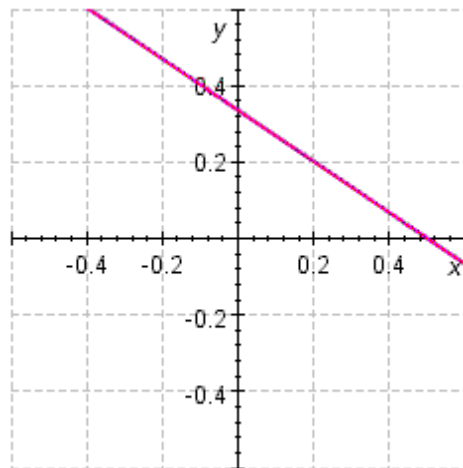
- d. The slope is  $\frac{2}{8}$ , and the y-intercept is  $-\frac{1}{8}$ .



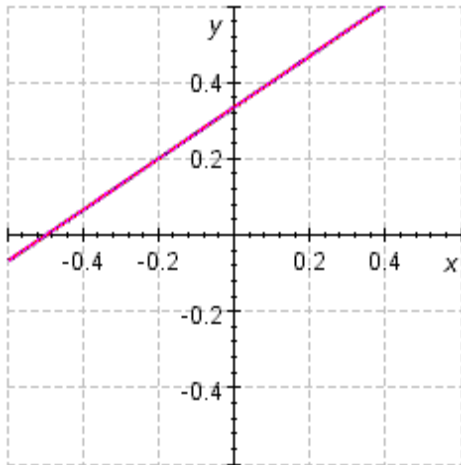
- b. The slope is  $-\frac{2}{3}$ , and the y-intercept is  $-\frac{1}{3}$ .



- e. The slope is  $-\frac{2}{3}$ , and the y-intercept is  $\frac{1}{3}$ .

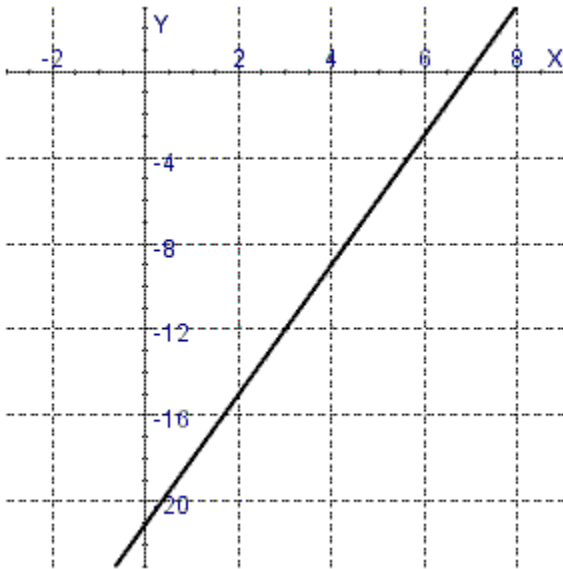


- c. The slope is  $\frac{2}{3}$ , and the y-intercept is  $\frac{1}{3}$ .



- \_\_\_ 29. Find the slope of the line through  $P(-9, -3)$  and  $Q(-5, -15)$ .
- $m = -2$
  - $m = -4$
  - $m = -5$
  - $m = -3$
  - $m = -1$

- \_\_\_ 30. Determine the correct equation for the line whose graph is sketched below.



- $y = -\frac{1}{3}x - 21$
  - $y = -3x + 21$
  - $y = -3x - 21$
  - $y = 3x - 21$
  - $y = 3x + 21$
- \_\_\_ 31. Determine the correct equation for the line passing through the point  $(-4, -15)$  with a slope of 5.
- $y = 5x + 5$
  - $y = 5x - 5$

c.  $y = -5x - 5$

d.  $y = \frac{1}{5}x + 5$

e.  $y = -5x + 5$

\_\_\_ 32. Determine the correct equation for the line passing through the point (1, 17) and the point (13, 4).

a.  $12y + 13x - 217 = 0$

b.  $12y - 13x - 217 = 0$

c. none of these

d.  $12y + 13x + 217 = 0$

e.  $12y - 13x + 217 = 0$

\_\_\_ 33. Determine the correct equation for the line with an  $x$ -intercept of  $-1$  and  $y$ -intercept 8.

a.  $y = \frac{1}{8}x + 8$

b.  $y = 8x + 8$

c.  $y = -\frac{1}{8}x - 8$

d.  $y = -8x + 8$

e.  $y = 8x - 8$

\_\_\_ 34. Determine the correct equation for the line passing through the point (1, 4) which is parallel to the line passing through both of the points (5, 3) and  $(-3, 75)$ .

a.  $y = -9x - 13$

b.  $y = 9x + \frac{1}{13}$

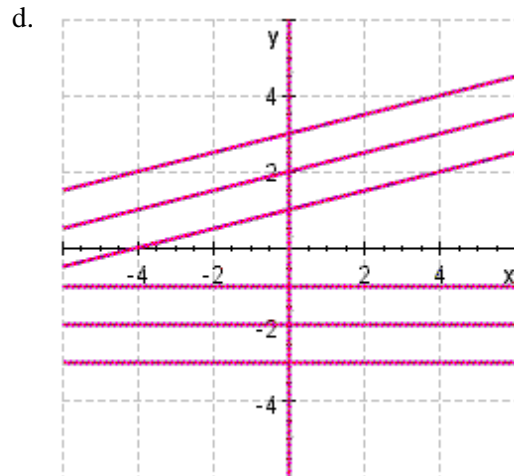
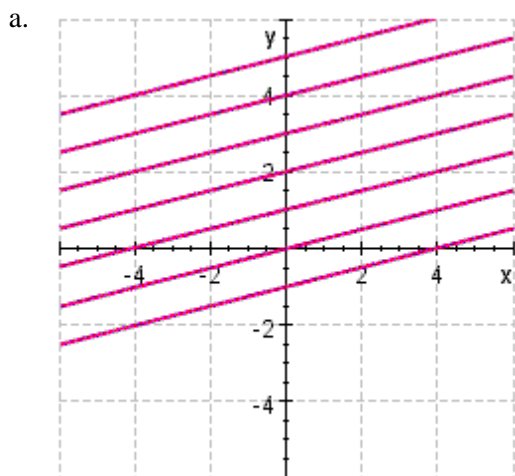
c.  $y = -9x + 13$

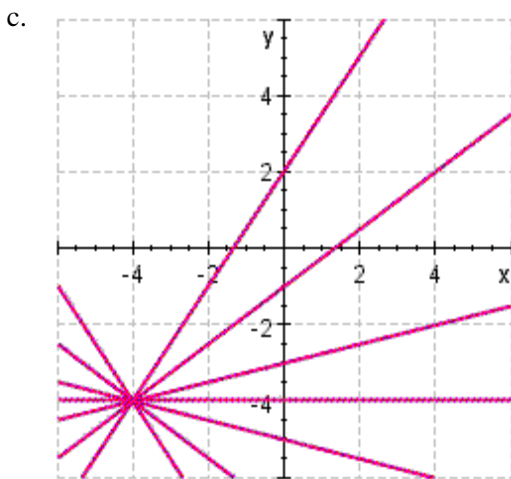
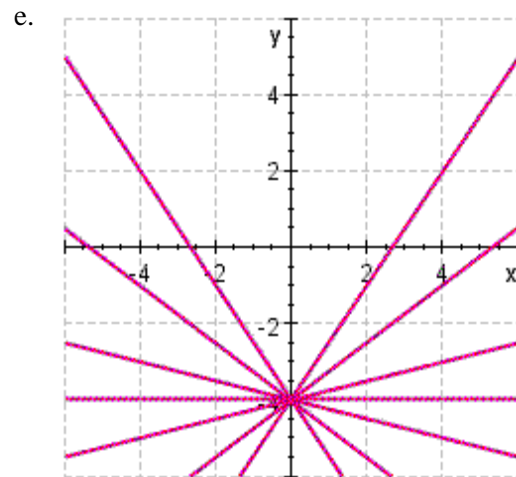
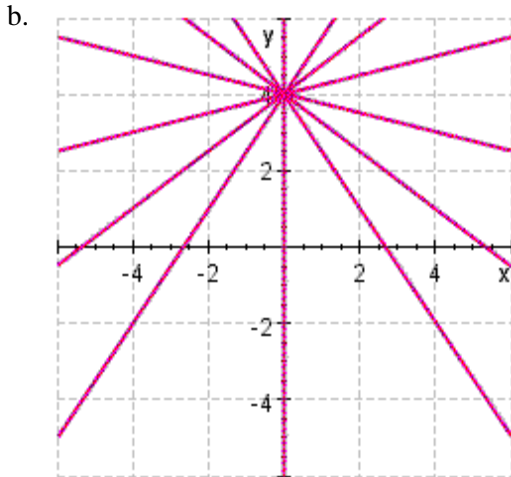
d.  $y = -9x + \frac{1}{13}$

e.  $y = -9x - \frac{1}{13}$

\_\_\_ 35. Use a graphing device to graph the given family of lines in the same viewing rectangle.

$y = mx - 4$ , for  $m = 0, \pm 0.25, \pm 0.75, \pm 1.5$





- \_\_\_ 36. Determine the equation that expresses  $A$  is proportional to  $G$  and inversely proportional to  $z$ . Symbols  $a$ ,  $b$ , and  $c$  are constants.
- $A = \frac{G}{z}$
  - $A = aGz$
  - $A = c \frac{G}{z}$
  - $A = zc \frac{G}{z}$
  - $A = b \frac{z}{G}$

- \_\_\_ 37. Express the statement as a formula.

$s$  is inversely proportional to the square root of  $t$

Use the information that if  $s = 2$  then  $t = 64$  to find the constant of proportionality.

- 128
- 1
- 19
- 2

e. 16

- \_\_\_\_\_ 38. The resistance  $R$  of a wire varies directly as its length  $L$  and inversely as the square of its diameter  $d$ . Find the constant of proportionality  $K$  if a wire 63.7 m long and 0.007 m in diameter has a resistance of 91 ohms. Find the resistance  $R_1$  of a wire made of the same material that is 1 m long and has a diameter of 0.002 m.
- $K = 0.000007$ ;  $R_1 = 20.28$
  - $K = 0.000007$ ;  $R_1 = 1.75$
  - $K = 0.00007$ ;  $R_1 = 30.7$
  - $K = 0.00007$ ;  $R_1 = 17.5$
  - $K = 0.00007$ ;  $R_1 = 0.035$
- \_\_\_\_\_ 39. In the short growing season of the Canadian arctic territory of Nunavut, some gardeners find it possible to grow gigantic cabbages in the midnight sun. Assume that the final size of a cabbage is proportional to the amount of nutrients it receives, and inversely proportional to the number of other cabbages surrounding it. A cabbage that received 20 oz of nutrients and had 6 other cabbages around it grew to 27 lb. What size would it grow to if it received 10 oz of nutrients and had only 3 cabbage neighbors?
- 28
  - 26
  - 29
  - 27
  - 23
- \_\_\_\_\_ 40. The heat experienced by a hiker at a campfire is proportional to the amount of wood on the fire, and inversely proportional to the cube of his distance from the fire. If he is 23 ft from the fire, and someone doubles the amount of wood burning, approximately how far from the fire would he have to be so that he feels the same heat as before?
- 46 ft
  - 29 ft
  - 34.5 ft
  - 109 ft
  - 18 ft