

Exam

Name \_\_\_\_\_

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

Solve the problem. Express your answer as an integer or simplified fraction.

1)  $\frac{1}{5}(x + 15) - \frac{1}{6}(x - 6) = x - 5$

A)  $\left\{\frac{30}{29}\right\}$

B)  $\left\{\frac{270}{29}\right\}$

C)  $\left\{\frac{90}{29}\right\}$

D)  $\left\{\frac{210}{29}\right\}$

Answer: B

2)  $7x - (5x - 1) = 2$

A)  $\frac{1}{12}$

B)  $-\frac{1}{2}$

C)  $\frac{1}{2}$

D)  $-\frac{1}{12}$

Answer: C

3)  $\frac{x}{6} - 4 = \frac{x}{3} - 3$

A) - 14

B) - 6

C) 14

D) - 2

Answer: B

4)  $-4(4x + 4) - 1 = -5(x + 1) + 3x$

A)  $\left\{\frac{1}{7}\right\}$

B)  $\left\{-\frac{2}{3}\right\}$

C)  $\left\{\frac{4}{7}\right\}$

D)  $\left\{-\frac{6}{7}\right\}$

Answer: D

5)  $\frac{5x - 7}{5} = \frac{7x + 3}{2}$

A)  $-\frac{1}{25}$

B)  $\frac{29}{45}$

C)  $\frac{1}{45}$

D)  $-\frac{29}{25}$

Answer: D

6)  $\frac{x}{16} - \frac{5}{8} = \frac{x + 6}{8}$

A) - 17

B) - 22

C) - 16

D) - 11

Answer: B

7) Solve:  $\frac{x - 2}{3} - \frac{x - 3}{6} = \frac{3 - x}{2} - 3$

A) 2

B) - 3

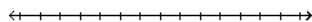
C) 3

D) - 2

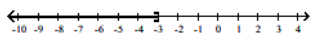
Answer: D

Solve the inequality and graph. Express your answer in interval notation.

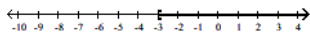
8)  $7x - 3 > 6x - 6$



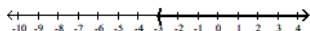
A)  $(-\infty, -3]$



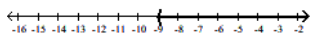
B)  $[-3, \infty)$



C)  $(-3, \infty)$

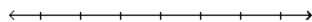


D)  $(-9, \infty)$

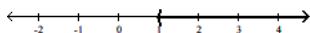


Answer: C

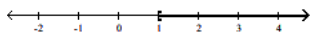
9)  $-3(3x + 6) < -12x - 15$



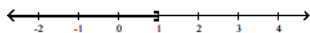
A)  $(1, \infty)$



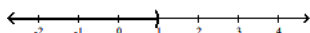
B)  $[1, \infty)$



C)  $(-\infty, 1]$

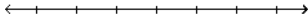


D)  $(-\infty, 1)$

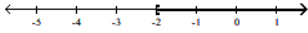


Answer: D

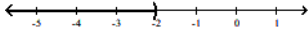
10)  $18x + 3 > 3(5x - 1)$



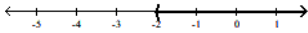
A)  $[-2, \infty)$



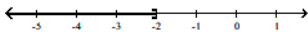
B)  $(-\infty, -2)$



C)  $(-2, \infty)$

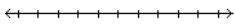


D)  $(-\infty, -2]$

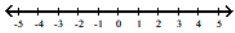


Answer: C

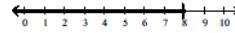
11)  $-4(-2 - x) < 6x + 19 - 11 - 2x$



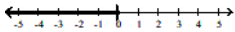
A)  $(-\infty, \infty)$



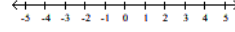
B)  $(-\infty, 8)$



C)  $(-\infty, 0)$

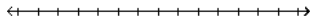


D)  $\emptyset$

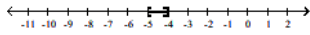


Answer: D

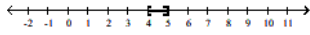
12)  $-23 \leq -4x - 3 \leq -19$



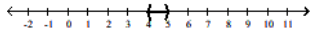
A)  $[-5, -4]$



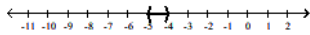
B)  $[4, 5]$



C)  $(4, 5)$



D)  $(-5, -4)$



Answer: B

Solve the formula for the specified variable.

13)  $S = 2\pi rh + 2\pi r^2$  for  $h$

A)  $h = \frac{S}{2\pi r} - 1$

B)  $h = \frac{S - 2\pi r^2}{2\pi r}$

C)  $h = 2\pi(S - r)$

D)  $h = S - r$

Answer: B

14)  $7x + 10y = 19$  for  $y$

A)  $-7x - 10y = -19$

B)  $y = 7x - 19$

C)  $y = -\frac{7}{10}x + \frac{19}{10}$

D)  $y = \frac{7}{10}x + \frac{19}{10}$

Answer: C

15)  $F = \frac{9}{5}C + 32$  for  $C$

A)  $C = \frac{5}{9}(F - 32)$

B)  $C = \frac{F - 32}{9}$

C)  $C = \frac{5}{F - 32}$

D)  $C = \frac{9}{5}(F - 32)$

Answer: A

16) Solve:  $D = \frac{4}{5}(mx - mb)$  for  $m$

A)  $m = \frac{5D}{4(x - b)}$

B)  $m = \frac{4D}{5(x - b)}$

C)  $m = \frac{4D}{5(x + b)}$

D)  $m = \frac{5D}{4(x + b)}$

Answer: A

Solve the problem.

17) Find the Celsius temperature (to the nearest degree) when Fahrenheit temperature is  $95^\circ$  by solving the equation  $95 = \frac{9}{5}C + 32$ , where  $F$  is the Fahrenheit temperature (in degrees) and  $C$  is the Celsius temperature.

A)  $35^\circ\text{C}$

B)  $177^\circ\text{C}$

C)  $203^\circ\text{C}$

D)  $49^\circ\text{C}$

Answer: A

18) At a local grocery store the demand for ground beef is approximately 50 pounds per week when the price per pound is \$4, but is only 40 pounds per week when the price rises to \$5.50 per pound. Assuming a linear relationship between the demand  $x$  and the price per pound  $p$ , express the price as a function of demand. Use this model to predict the demand if the price rises to \$5.80 per pound.

- A)  $p = -0.15x - 11.5$ ; 40 pounds                      B)  $p = -0.15x + 11.5$ ; 38 pounds  
 C)  $p = 11.5x + -0.15$ ; 40 pounds                      D)  $p = 0.15x + 11.5$ ; 38 pounds

Answer: B

19) Assume that the price per unit  $d$  of a certain item to the consumer is given by the equation  $d = 35 - .10x$ , where  $x$  is the number of units in demand. The price per unit from the supplier is given by the equation  $s = .2x + 20$ , where  $x$  is the number of units supplied. Find the equilibrium price and the equilibrium quantity.

- A) equilibrium price: \$35 per unit; equilibrium quantity: 50 units  
 B) equilibrium price: \$50 per unit; equilibrium quantity: 30 units  
 C) equilibrium price: \$30 per unit; equilibrium quantity: 50 units  
 D) equilibrium price: \$20 per unit; equilibrium quantity: 50 units

Answer: C

20) A piece of equipment was purchased by a company for \$10,000 and is assumed to have a salvage value of \$3,000 in 10 years. If its value is depreciated linearly from \$10,000 to \$3,000, find a linear equation in the form  $V = mt + b$ ,  $t$  time in years, that will give the salvage value at any time  $t$ ,  $0 \leq t \leq 10$ .

- A)  $V = 700t + 10,000$                                               B)  $T = -700V + 10,000$   
 C)  $V = -700t - 10,000$                                               D)  $V = -700t + 10,000$

Answer: D

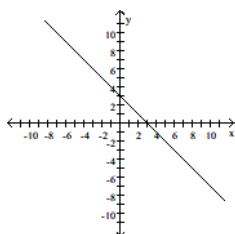
21) You have \$50,000 and wish to invest part at 10% and the rest at 6%. How much should be invested at each rate to produce the same return as if it all had been invested at 9%?

- A) \$37,000 at 10%, \$13,000 at 6%                                              B) \$37,500 at 10%, \$12,500 at 6%  
 C) \$37,500 at 6%, \$12,500 at 10%                                              D) \$37,000 at 6%, \$13,000 at 10%

Answer: B

Determine whether the slope of the line is positive, negative, zero, or undefined.

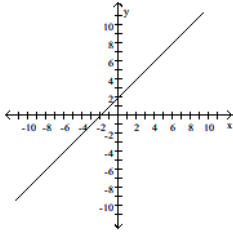
22)



- A) negative                                              B) positive                                              C) undefined                                              D) zero

Answer: A

23)



A) undefined

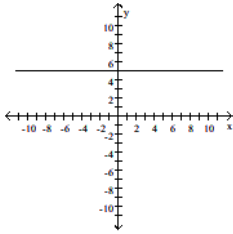
B) positive

C) zero

D) negative

Answer: B

24)



A) negative

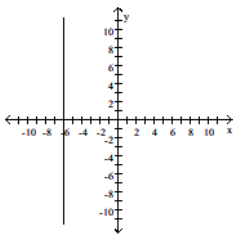
B) undefined

C) zero

D) positive

Answer: C

25)



A) zero

B) undefined

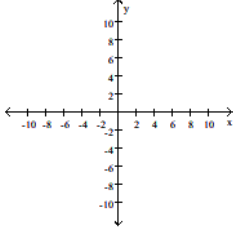
C) negative

D) positive

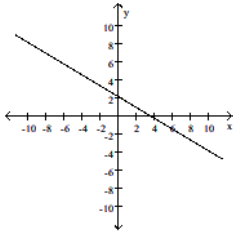
Answer: B

Graph the linear equation and determine its slope, if it exists.

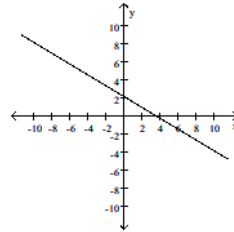
26)  $3x + 5y = 11$



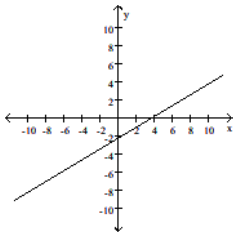
A) slope:  $-\frac{3}{4}$



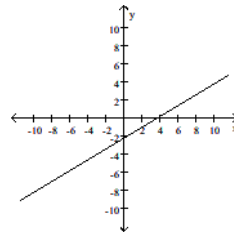
B) slope:  $\frac{3}{4}$



C) slope:  $-\frac{3}{4}$

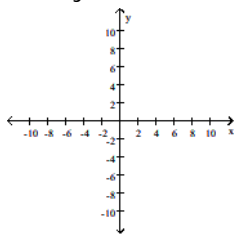


D) slope:  $\frac{3}{4}$

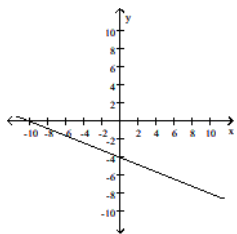


Answer: A

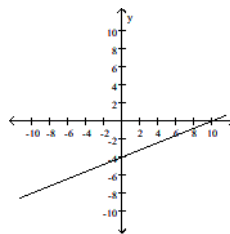
27)  $2x - 5y = 20$



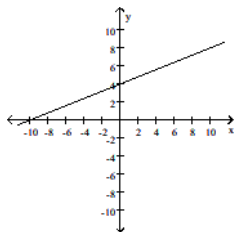
A) slope =  $-\frac{2}{5}$



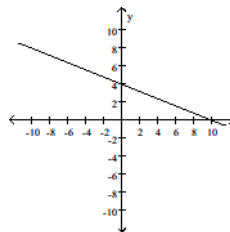
B) slope =  $\frac{2}{5}$



C) slope =  $\frac{2}{5}$



D) slope =  $-\frac{2}{5}$



Answer: B



Find the slope and y intercept of the graph of the equation.

28)  $y = 3x - 6$

- A) Slope = 6, y intercept = 3  
C) Slope = 3, y intercept = -6

- B) Slope = 3, y intercept = 6  
D) Slope = -6, y intercept = 3

Answer: C

29)  $y = -4x + 6$

- A) Slope = -4, y intercept = 6  
C) Slope = 6, y intercept = -4

- B) Slope = -6, y intercept = -4  
D) Slope = 4, y intercept = -6

Answer: A

30)  $y = \frac{5}{2}x - \frac{7}{2}$

- A) Slope =  $\frac{5}{2}$ ; y intercept =  $\frac{7}{2}$   
C) Slope =  $\frac{5}{2}$ ; y intercept =  $-\frac{7}{2}$

- B) Slope =  $-\frac{7}{2}$ ; y intercept =  $\frac{5}{2}$   
D) Slope =  $\frac{7}{2}$ ; y intercept =  $\frac{5}{2}$

Answer: C

31)  $y = -\frac{4}{5}x + \frac{32}{5}$

- A) Slope =  $\frac{4}{5}$ ; y intercept =  $\frac{32}{5}$   
C) Slope =  $\frac{4}{5}$ ; y intercept =  $\frac{22}{5}$

- B) Slope =  $\frac{5}{4}$ ; y intercept =  $\frac{22}{5}$   
D) Slope =  $-\frac{4}{5}$ ; y intercept =  $\frac{32}{5}$

Answer: D

32)  $y = -\frac{x}{2} + 3$

- A) Slope = 3; y intercept =  $\frac{1}{2}$   
C) Slope =  $-\frac{1}{2}$ ; y intercept = 3

- B) Slope = 3; y intercept =  $-\frac{1}{2}$   
D) Slope =  $-\frac{1}{2}$ ; y intercept = -3

Answer: C

33)  $y = x - 5$

- A) Slope = 1; y intercept = -5  
C) Slope = -5; y intercept = 1

- B) Slope = -5; y intercept = -1  
D) Slope = 0; y intercept = 5

Answer: A

Write an equation of the line with the indicated slope and y intercept.

34) Slope = 4, y intercept = -5

- A)  $y = 5x - 4$                       B)  $y = 5x + 4$                       C)  $y = 4x - 5$                       D)  $y = -4x - 5$

Answer: C

35) Slope = -4, y intercept = 6

- A)  $y = 4x + 6$                       B)  $y = 6x - 4$                       C)  $y = -4x - 6$                       D)  $y = -4x + 6$

Answer: D

36) Slope =  $\frac{5}{2}$ ; y intercept =  $-\frac{3}{2}$

A)  $y = -\frac{3}{2}x + \frac{5}{2}$

B)  $y = \frac{3}{2}x - \frac{5}{2}$

C)  $y = \frac{5}{2}x + \frac{3}{2}$

D)  $y = \frac{5}{2}x - \frac{3}{2}$

Answer: D

37) Slope =  $-\frac{3}{4}$ ; y intercept =  $\frac{21}{4}$

A)  $y = \frac{3}{4}x + \frac{13}{4}$

B)  $y = -\frac{4}{3}x + \frac{21}{4}$

C)  $y = -\frac{3}{4}x - \frac{21}{4}$

D)  $y = -\frac{3}{4}x + \frac{21}{4}$

Answer: D

38) Slope =  $-\frac{1}{2}$ ; y intercept =  $-2$

A)  $y = -2x + \frac{1}{2}$

B)  $y = -\frac{x}{2} - 2$

C)  $y = \frac{x}{2} - 2$

D)  $y = -2x - \frac{1}{2}$

Answer: B

39) Slope =  $1$ ; y intercept =  $1$

A)  $y = -x + 1$

B)  $y = 1x - 1$

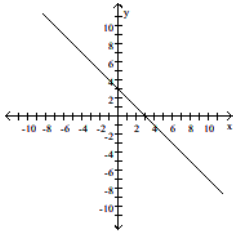
C)  $y = x + 1$

D)  $y = 1x + 1$

Answer: C

Provide an appropriate response.

40) Use the graph to find the slope-intercept form of the equation of the line.



A)  $y = x - 3$

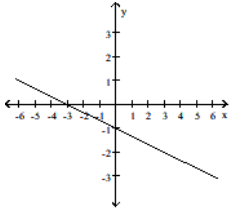
B)  $y = 3x$

C)  $y = -x + 3$

D)  $y = x + 3$

Answer: C

41) Write the equation of the line in the following graph.



A)  $f(x) = \frac{1}{3}x - 1$

B)  $f(x) = -\frac{1}{3}x - 1$

C)  $f(x) = -\frac{1}{3}x + 1$

D)  $f(x) = \frac{1}{3}x + 1$

Answer: B

42) Find the slope of the line  $3x + 4y = 11$ .

A)  $\frac{3}{4}$

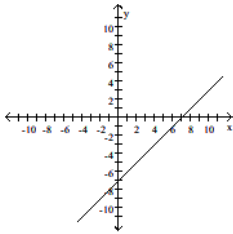
B)  $-\frac{3}{4}$

C)  $-\frac{4}{3}$

D) 0

Answer: B

43) Use the graph to find the slope, x-intercept and y-intercept of the line.



A) slope = -1  
x-intercept = (7, 0)  
y-intercept = (0, -7)

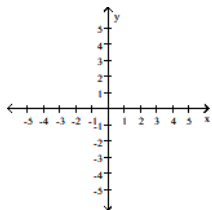
C) slope = 1  
x-intercept = (0, 7)  
y-intercept = (-7, 0)

B) slope = 1  
x-intercept = (7, 0)  
y-intercept = (0, -7)

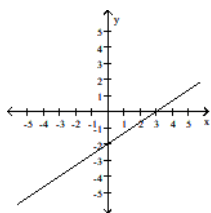
D) slope = -1  
x-intercept = (-7, 0)  
y-intercept = (0, 7)

Answer: B

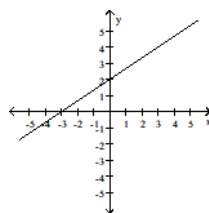
44) Graph the linear function defined by  $f(x) = \frac{2}{3}x + 2$  and indicate the slope and intercepts.



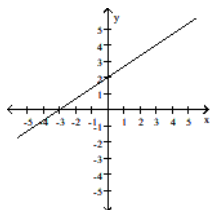
A) x-intercept = -2; y-intercept = 3; slope  $\frac{2}{3}$



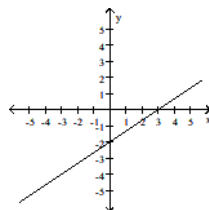
B) x-intercept = -3; y-intercept = 2; slope  $\frac{2}{3}$



C) x-intercept = 2; y-intercept = -3; slope  $\frac{2}{3}$



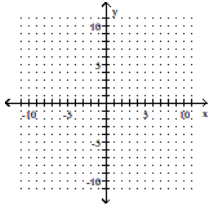
D) x-intercept = 3; y-intercept = -2; slope  $\frac{2}{3}$



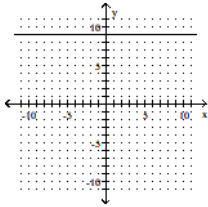
Answer: B

Graph the equation.

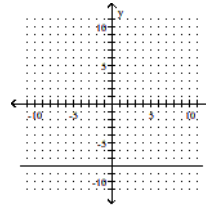
45)  $72 + 8y = 0$



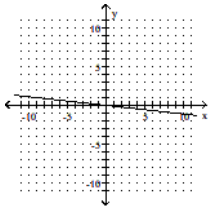
A)



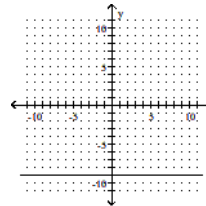
B)



C)



D)



Answer: D

Provide an appropriate response.

46) Find the line passing through the two points. Write the equation in standard form.

(10, 9) and (10, 1)

A)  $x + y = 11$

B)  $x = 10$

C)  $x + y = 19$

D)  $y = 9$

Answer: B

47) Find the line passing through the two points. Write the equation in standard form.

(-3, 6) and (6, 6)

A)  $x = -2$

B)  $-x - 2y = 0$

C)  $y = 6$

D)  $-2x - y = 0$

Answer: C

Write the slope-intercept equation ( $y = mx + b$ ) for a line with the given characteristics.

48)  $m = -4$ ,  $y$ -intercept  $(0, -7)$

A)  $y = -4x$

B)  $y = -4x - 7$

C)  $y = -7x - 4$

D)  $4x + y = -7$

Answer: B

49)  $m = 3$ , passing through  $(1, -2)$

A)  $y = 3x - 5$

B)  $y = 3x$

C)  $y = 5x - 3$

D)  $y - 5 = 3x$

Answer: A

Provide an appropriate response.

50) Find the standard form of the equation of the line with slope of  $-\frac{2}{7}$  and passing through  $(4, 4)$ .

A)  $2x - 7y = 36$

B)  $7x + 2y = -36$

C)  $2x + 7y = -36$

D)  $2x + 7y = 36$

Answer: D

Find the slope of the line containing the given points.

51)  $(9, -7)$ ;  $(-6, 6)$

A)  $\frac{13}{15}$

B)  $-\frac{15}{13}$

C)  $-\frac{13}{15}$

D)  $\frac{15}{13}$

Answer: C

52)  $(6, 1)$  and  $(6, -4)$

A)  $-4$

B)  $0$

C)  $-\frac{1}{4}$

D) Undefined

Answer: D

53)  $(-5, 2)$  and  $(0, 2)$

A)  $0$

B)  $\frac{5}{2}$

C)  $-\frac{5}{2}$

D) Undefined

Answer: A

Provide an appropriate response.

54) Find the standard form of the equation of the line passing through the two points.

$(2, -6)$  and  $(-9, 6)$

A)  $12x + 11y = -42$

B)  $-8x + 15y = -18$

C)  $8x - 15y = -18$

D)  $-12x + 11y = -42$

Answer: A

55) Write the equation of a line that passes through  $(3, 9)$  and  $(0, -7)$ . Write the final answer in the form  $Ax + By = C$  where  $A$ ,  $B$ , and  $C$  are integers with no common divisors (other than  $\pm 1$ ) and  $A > 0$ .

A)  $16x - 3y = -21$

B)  $16x - 3y = 21$

C)  $-16x + 3y = 21$

D)  $3x - 16y = 21$

Answer: B

56) Write the equation of a line that passes through  $(-1, 4)$  and  $(5, -1)$ . Write the final answer in the form  $Ax + By = C$  where  $A$ ,  $B$ , and  $C$  are integers with no common divisors (other than  $\pm 1$ ) and  $A > 0$ .

A)  $5x + 6y = 19$

B)  $5x + 6y = -19$

C)  $5x - 6y = 19$

D)  $-5x + 6y = 19$

Answer: A

Solve the problem.

- 57) The cost of manufacturing a computer part is related to the quantity produced,  $x$ , during a production run. When 100 parts are produced, the cost is \$300. When 600 parts are produced, the cost is \$4800. Find an equation of the line relating quantity produced to cost. Write the final answer in the form  $C = mx + b$ .

A)  $C = 600x + 9$                       B)  $C = 9x$                       C)  $C = 9x + 600$                       D)  $C = 9x - 600$

Answer: D

- 58) The cost for labor associated with fixing a washing machine is computed as follows: There is a fixed charge of \$25 for the repairman to come to the house, to which a charge of \$20 per hour is added. Find an equation that can be used to determine the labor cost,  $C$ , of a repair that takes  $x$  hours. Write the final answer in the form  $C = mx + b$ .

A)  $C = 45x$                       B)  $C = -20x + 25$                       C)  $C = 20x + 25$                       D)  $C = 25x + 20$

Answer: C

- 59) A small company that makes hand-sewn leather shoes has fixed costs of \$320 a day, and total costs of \$1200 per day at an output of 20 pairs of shoes per day. Assume that total cost  $C$  is linearly related to output  $x$ . Find an equation of the line relating output to cost. Write the final answer in the form  $C = mx + b$ .

A)  $C = 44x + 320$                       B)  $C = 60x + 1520$                       C)  $C = 60x + 320$                       D)  $C = 44x + 1520$

Answer: A

- 60) Using a phone card to make a long distance call costs a flat fee of \$0.85 plus per \$0.19 minute starting with the first minute. Find the total cost of a phone call which lasts 8 minutes.

A) \$6.00                      B) \$1.52                      C) \$2.37                      D) \$8.16

Answer: C

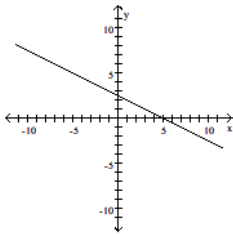
- 61) The mathematical model  $C = 600x + 30,000$  represents the cost in dollars a company has in manufacturing  $x$  items during a month. Using this model, how much does it cost to produce 600 items?

A) \$50.00                      B) \$0.08                      C) \$360,000                      D) \$390,000

Answer: D

Use the graph to find the average rate of change.

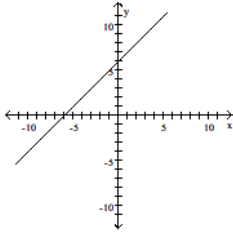
62)



A)  $-\frac{1}{2}$                       B)  $-2$                       C)  $2$                       D)  $\frac{1}{2}$

Answer: A

63)



A) -1

B) -6

C) 6

D) 1

Answer: D

Provide an appropriate response.

64) Given two points  $(x_1, y_1)$  and  $(x_2, y_2)$ , the ratio of the change in  $y$  to the change in  $x$  is called.

A) slope

B) x-intercept

C) equilibrium point

D) break-even point

Answer: A

Use the REGRESSION feature on a graphing calculator.

65) The paired data below consists of the temperature on randomly chosen days and the amount of a certain kind of plant grew (in millimeters).

Temp, $x$	62	76	50	51	71	46	51	44	79
Growth, $y$	36	39	50	13	33	33	17	6	16

Find the linear function that predicts a plant's growth as a function of the temperature. Round your answer to two decimal places.

A)  $y = -9.19x^3 + 0.11x^2 - 2.90x + 6.54$

B)  $y = -0.06x^2 + 7.20x - 191.23$

C)  $y = 14.57x + 0.21$

D)  $y = 0.21x + 14.57$

Answer: D

66) The use of bottled water in the United States has shown a steady increase in recent years. The table shows the annual per capita consumption for the years 1995 - 2001.

Year	1995	1996	1997	1998	1999	2000	2001
Gallons/person	4.4	5.1	5.7	6.4	7.3	8.0	10.2

With  $x$  being the years since 1995, find the linear function that represents this data. Round your answer to two decimal places.

A)  $y = 0.04x^3 - 0.23x^2 + 1.01x + 4.35$

B)  $y = 0.89x + 4.07$

C)  $y = 0.1x^2 + 0.29x + 4.57$

D)  $y = 4.07x + 0.89$

Answer: B



- 67) A study was conducted to compare the average time spent in the lab each week versus course grade for computer students. The results are recorded in the table below.

Hours in lab	10	11	16	9	7	15	16	10
Grade (percent)	96	51	62	58	89	81	46	51

Use linear regression to find a linear function that predicts a student's course grade as a function of the number of hours spent in lab.

- A)  $y = 1.86 + 88.6x$                       B)  $y = 0.930 + 44.3x$                       C)  $y = 44.3 + 0.930x$                       D)  $y = 88.6 - 1.86x$

Answer: D

- 68) In the table below,  $x$  represents the number of years since 2000 and  $y$  represents sales (in thousands of dollars) of a clothing company. Use the regression equation to estimate sales in the year 2006. Round to the nearest thousand dollars.

Year $x$	1	2	3	4	5
Sales $y$	84	76	39	30	26

- A) \$14,000                                      B) \$20,000                                      C) \$2,000                                      D) \$8,000

Answer: C

- 69) For some reason the quality of production decreased as the year progressed at a flash drive manufacturing plant. The following data represent the percentage of defective flash drives produced at the plant in the corresponding month of the year.

Month, $x$	2	3	5	7	8	9	12
% defective, $y$	1.3	1.6	2.0	2.4	2.6	2.8	3.1

Use the regression equation with values rounded to four decimals to predict the percentage of defective drives in June.

- A) 2.0%                                      B) 2.20%                                      C) 2.3%                                      D) 2.15%

Answer: D

- 70) Efficiency experts rate employees according to job performance and attitude. The results for several randomly selected employees are given below.

Attitude, $x$	59	63	65	69	58	77	76	69	70	64
Performance, $y$	72	67	78	82	75	87	92	83	87	78

Find the regression line which can be used to predict performance rating if attitude rating is known.

- A)  $y = 2.81 + 1.35x$                       B)  $y = -47.3 + 2.02x$                       C)  $y = 11.7 + 1.02x$                       D)  $y = 92.3 - 0.669x$

Answer: C

Solve the problem.

- 71) Suppose the sales of a particular brand of MP3 player satisfy the relationship  $S = 200x + 3800$ , where  $S$  represents the number of sales in year  $x$ , with  $x = 0$  corresponding to 2002. Find the number of sales in 2005.

- A) 12,600                                      B) 4400                                      C) 6400                                      D) 4200

Answer: B