Exam

Name_____

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

Determine whether or not the relationship shown in the table is a function.

1)

x	-2	2	4	9	10
y	2	4	-1	2	1

Does the table define y as a function of x?

A) Yes B) No

Answer: A

2)

x	1	3	5	8	11
y	8	1	4	8	-3

Does the table define x as a function of y?

A) Yes B) No

Answer: B

3)

x	-6	-6	1	4	8
y	5	4	6	3	8

Does the table define x as a function of y?

A) Yes B) No

Answer: B

4)

x	y
5	12
7	3
5	7
4	5

Does the table define y as a function of x?

A) Yes B) No

Answer: B

5)

Name	Test Score
Bob L.	80
Susan H.	83
Jim H.	76
Bruce B.	96

Does the table define test score as a function of name?

A) Yes B) No

Answer: A

6)

January	1	2	3	4	5	6	7
Weight (lbs)	197	196	198	197	196	195	194

Does the table define weight as a function of the day in January?

A) Yes B) No

Answer: A

7)

January	1	2	3	4	5	6	7
Weight (lbs)	218	217	219	218	217	216	215

Does the table define the day in January as a function of weight?

A) Yes B) No

Answer: B

8)

Number of Classes Missed	1	2	3	4	5	6	7
Average Final Exam Score	75	73	76	69	68	65	60

Does the table define the average final exam score as a function of the number of classes missed?

A) Yes B) No

Answer: A

9)

Number of Classes Missed	1	2	3	4	5	6	7
Average Final Exam Score	80	78	81	74	73	70	65

Does the table define the number of classes missed as a function of the average final exam score?

A) Yes B) No

Answer: A

10)

Down payment (%)	5	10	20	25
Price of Home ($)	102,700	122,900	158,400	169,000

Does the table define the price of a home that a particular family can afford as a function of the percent down pa

A) Yes B) No

Answer: A

Use the table to answer the question.

11)

x	-8	-3	-1	0	1	9	15
y = f(x)	-31	-16	-10	-7	-4	20	38

Is -3 an input or output of this function?

A) Output B) Input

Answer: B

12)

x	-6	-3	-1	0	1	5	16
y = f(x)	-25	-16	-10	-7	-4	8	41

Is f(16) an input or output of this function?

A) Input B) Output

Answer: B

13)

x	-2	0	1	8	12	17	31
y = g(x)	5	9	11	25	33	43	71

Is 31 an input or output of this function?

A) Input B) Output

Answer: A

14)

x	-3	0	1	6	13	18	31
y = g(x)	3	9	11	21	35	45	71

Is g(6) an input or output of this function?

A) Input B) Output

Answer: B

Evaluate the function.

15) Given $f(x) = 19x - 4$, find f(17).

A) 19 B) 319 C) -327 D) 327

Answer: B

16) Given $f(x) = (x + 3)^2$, find f(2).

A) 1 B) -25 C) 10 D) 25

Answer: D

17) Given $f(x) = 2x^2 - 3x - 3$, find f(-4).

A) 44 B) 26 C) 1 D) 41

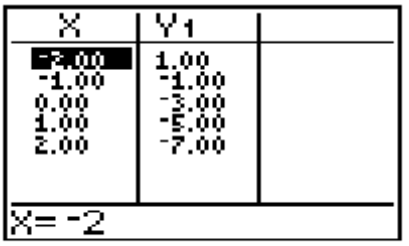
Answer: D

18) Given $f(x) = x^2 - 5x - 1$, find f(-2).

A) -5 B) -7 C) 15 D) 13

Answer: D

19)

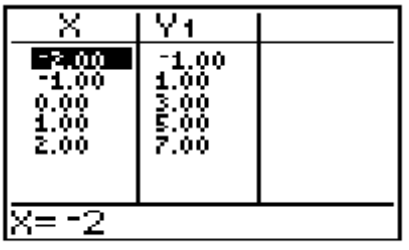


For the function y = f(x) described by the table, find f(1).

A) -2 B) -5 C) 0 D) Not shown

Answer: B

20)

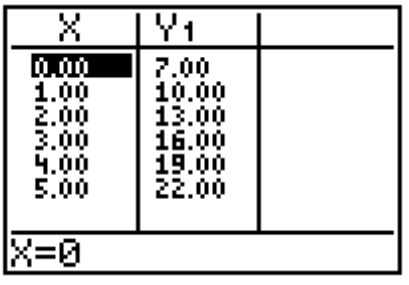


For the function y = f(x) described by the table, find f(2).

A) 7 B) 0 C) 2 D) Not shown

Answer: A

21)

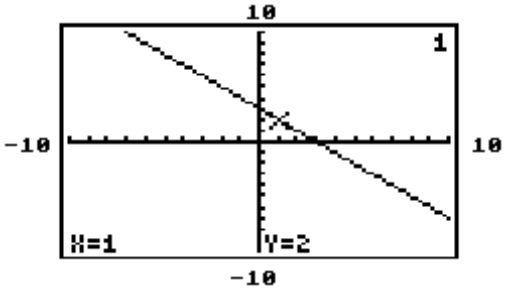


For the function y = f(x) described by the table, find f(2).

A) 10 B) 13 C) 7 D) 16

Answer: B

22)

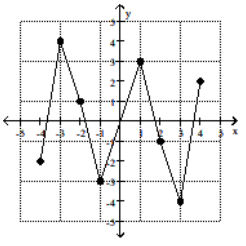


If y = f(x), find f(1).

A) 1 B) 2 C) 0 D) -2

Answer: B

23)

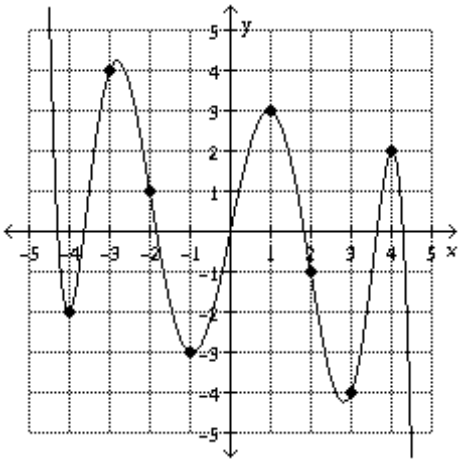


If y = f(x), find f(-2).

A) -1 B) 1 C) -4 D) 4

Answer: B

24)



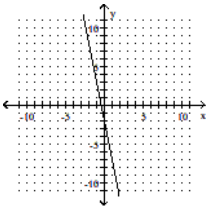
If y = f(x), find f(4).

A) -2 B) 2 C) -3 D) 3

Answer: B

State whether the graph is or is not that of a function.

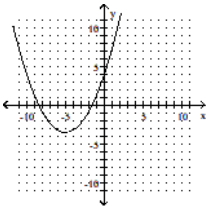
25)



A) Yes B) No

Answer: A

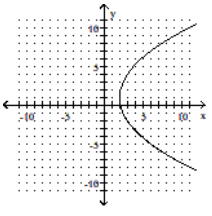
26)



A) Yes B) No

Answer: A

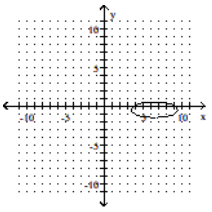
27)



A) Yes B) No

Answer: B

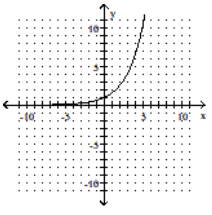
28)



A) Yes B) No

Answer: B

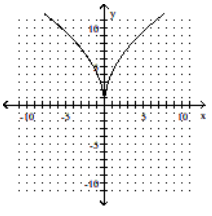
29)



A) Yes B) No

Answer: A

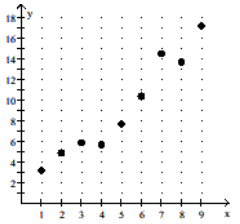
30)



A) Yes B) No

Answer: A

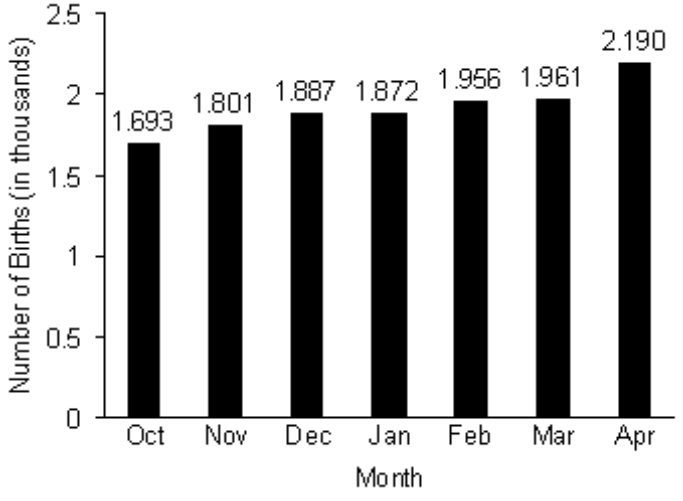
31)



A) Yes B) No

Answer: A

32)



A) Yes B) No

Answer: A

Decide whether or not the set of ordered pairs defines a function.

33) {(-3, -6), (2, -8), (6, 6), (8, -4), (12, -1)}

A) No B) Yes

Answer: B

34) {(-3, 5), (-2, -9), (3, -8), (3, 6)}

A) No B) Yes

Answer: A

35) {(-6, -9), (-6, -4), (1, 4), (6, -4), (8, -1)}

A) Yes B) No

Answer: B

36) {(2, 4), (2, 7), (4, 4), (8, -3), (10, 5)}

A) Yes B) No

Answer: B

37) {(-3, -3), (-1, 5), (4, -7), (5, 3)}

A) No B) Yes

Answer: B

38) {(-6, -1), (-6, 7), (2, -8), (6, -9), (7, 2)}

A) Yes B) No

Answer: B

39) {(-8, -8), (-3, 8), (-2, -8), (2, -5)}

A) Yes B) No

Answer: A

40) {(-3, 8), (-2, -3), (1, 3), (1, -5)}

A) No B) Yes

Answer: A

41) {(-3, -5), (-1, 2), (2, -3), (7, 2)}

A) No B) Yes

Answer: B

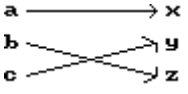
42) {(1, 4), (2, 5), (5, -3), (7, 5), (11, 8)}

A) Yes B) No

Answer: A

Decide whether or not the arrow diagram defines a function.

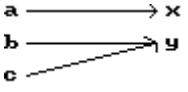
43) Domain Range



A) Yes B) No

Answer: A

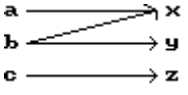
44) Domain Range



A) No B) Yes

Answer: B

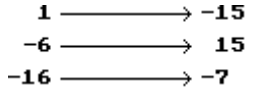
45) Domain Range



A) Yes B) No

Answer: B

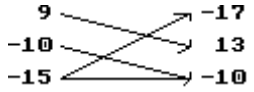
46) Domain Range



A) Yes B) No

Answer: A

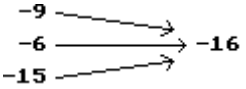
47) Domain Range



A) No B) Yes

Answer: A

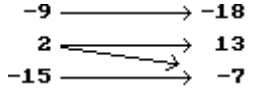
48) Domain Range



A) No B) Yes

Answer: B

49) Domain Range

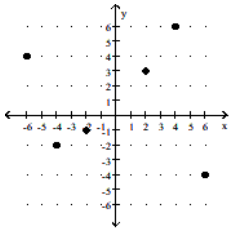


A) Yes B) No

Answer: B

Find the domain and range for the function.

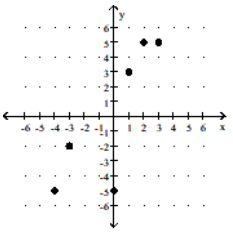
50)



A) D: {-6, -4, -2, 0, 2, 4, 6}; R: {-4, -2, -1, 3, 4, 6} B) D: {-6, -4, -2, 2, 4, 6}; R: {-4, -2, -1, 3, 4, 6}

C) D: {-6, -4, 4, 6}; R: {-4, -2, 4, 6} D) D: {-4, -2, -1, 3, 4, 6}; R: {-6, -4, -2, 2, 4, 6}

Answer: B

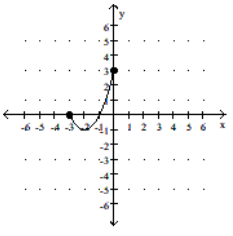


51)

A) D: {-4, -3, 0, 1, 2, 3}; R: {-5, -2,3, 5}
B) D: {-5, -2,3, 5}; R: {-4, -3, 1, 2, 3}
C) D: {-4, -3, 1, 2, 3}; R: {-5, -2,3, 5}
D) D: {-5, -2,3, 5}; R: {-4, -3, 0, 1, 2, 3}

Answer: A

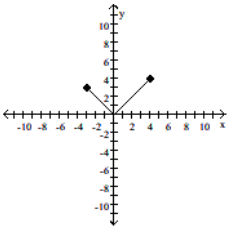
52)



A) D: [-3, 0]; R: [-1, 3]
B) D: [0, 3]; R: (-∞, 3]
C) D: (-∞, 3]; R: [0, 3]
D) D: [-1, 3]; R: [-3, 0]

Answer: A

53)



A) D: [0, 4]; R: [-3, 4]
B) D: [-3, 4]; R: [0, 4]
C) D: (-3, 4); R: (0, 4)
D) D: [3, 4]; R: [0, 4]

Answer: B

Find the domain of the function.

54) $y = \sqrt{7 + x}$

A) $[-7, \infty)$ B) $(-\infty, \infty)$ C) $(-\infty, -7]$ D) $[0, \infty)$

Answer: A

55) $y = \sqrt{20 - x}$

A) $(-\infty, \infty)$ B) $(\sqrt{20}, \infty)$

C) all real numbers except 20 D) $[\infty, 20]$

Answer: D

56) $y = \sqrt{6x - 5}$

A) $\left(\frac{5}{6}, \infty\right)$ B) (∞, ∞) C) $\left[\frac{5}{6}, \infty\right)$ D) $\left[-\frac{5}{6}, \infty\right)$

Answer: C

57) $y = \frac{x}{\sqrt{x - 4}}$

A) $(4, \infty)$ B) all real numbers except 4

C) $[4, \infty)$ D) $(-\infty, \infty)$

Answer: A

58) $y = 6 - \frac{1}{x}$

A) $(-\infty, \infty)$ B) $(6, \infty)$

C) all real numbers except 0 D) $(-\infty, 1)$

Answer: C

59) $y = \frac{-8}{x - 2}$

A) $(2, \infty)$ B) all real numbers except -2

C) $(-\infty, 2)$ D) all real numbers except 2

Answer: D

60) $y = \frac{17}{12 - x}$

A) All real numbers except 12 B) $(12, \infty)$

C) All real numbers except -12 D) $(-\infty, 12)$

Answer: A

61) $y = 10 + \frac{10}{4x + 12}$

A) $(\infty, -3)$ B) all real numbers except 3

C) $(-3, \infty)$ D) all real numbers except -3

Answer: D

62) Suppose the cost of producing x objects was defined by the function $C(x) = \frac{60x}{\sqrt{60x - 10}}$. What is the domain of the function defined by this equation?

A) $\left(\frac{1}{6}, \infty\right)$ B) $\left(-\infty, \frac{1}{6}\right]$ C) $\left(-\infty, \frac{1}{6}\right)$ D) $\left[\frac{1}{6}, \infty\right)$

Answer: A

Decide whether or not the equation defines y as a function of x.

63) $y = 2x - 3$

A) Yes B) No

Answer: A

64) $x^2 + y = -6$

A) Yes B) No

Answer: A

65) $y = 2x^2 + 2x - 1$

A) Yes B) No

Answer: A

66) $x - y^2 = -8$

A) Yes B) No

Answer: B

67) $y^2 = (x - 6)(x + 4)$

A) Yes B) No

Answer: B

68) $y = \sqrt{3x - 7}$

A) Yes B) No

Answer: A

69) $y = \frac{6}{x + 19}$

A) Yes B) No

Answer: A

Determine whether the given relationship defines a function. If so, identify the independent and dependent variable, and why the relationship is a function.

70) Addy's height h on the first day d of school throughout elementary school.

A) No

B) Yes; d, h; there is one height for each school year.

Answer: B

71) Derek's weight w in second grade g.

A) No B) Yes; g, w; there is one weight for second grade.

Answer: A

72) The balance in a checking account b at the close of business on a given day x.
A) Yes; x, b; there is one balance b on any given day x at the close of the business day.
B) No
Answer: A

73) The balance b in a checking account on a given day x.
A) Yes; x, b; there is one balance b on a given day x.
B) No
Answer: B

74) The temperature t on a backyard thermometer at 5 pm on a given day x.
A) Yes; x, t; there is one temperature t on any given day x at 5 pm.
B) No
Answer: A

75) The temperature t on a backyard thermometer on a given day x.
A) Yes; x, t; there is one temperature t on any given day x.
B) No
Answer: B

76) The salary s of an employee on her hiring date d.
A) No
B) Yes; d, s; there is one salary s on the hiring date d.
Answer: B

77) The salary s of an employee in a given year y.
A) No
B) Yes; y, s; there is one salary s in any given year y.
Answer: A

78) The number of shares s of a certain stock traded on a given day x.
A) No
B) Yes; x, s; there is one number of shares s traded on any given day x.
Answer: B

79) A customer's savings account number n given the number of years y the account has been active.
A) No
B) Yes; y, n; there is one account number n in any given year y.
Answer: A

Solve the problem.

80) This chart shows the fees for an 18-hole round of golf for each of the last 5 years at a local municipal golf course. Assume that this chart defines a function with the name of f. State the domain of f.

Year	Fee
2008	$22
2009	$24
2010	$26
2011	$26
2012	$30

A) {(2008, 22), (2009, 24), (2010, 26), (2011, 26), (2012, 30)}
B) {2008, 2009, 2010, 2011, 2012}
C) {22, 24, 26, 30}
D) {(22, 2008), (24, 2009), (26, 2010), (26, 2011), (30, 2012)}

Answer: B

81) This chart shows the fees for an 18-hole round of golf for each of the last 5 years at a local municipal golf course. Assume that this chart defines a function with the name of f. State the range of f.

Year	Fee
2008	$22
2009	$23
2010	$25
2011	$25
2012	$27

A) {(22, 2008), (23, 2009), (25, 2010), (25, 2011), (27, 2012)}
B) {22, 23, 25, 27}
C) {(2008, 22), (2009, 23), (2010, 25), (2011, 25), (2012, 27)}
D) {2008, 2009, 2010, 2011, 2012}

Answer: B

82) This chart shows the number of meals served in a restaurant during each of the past 4 months. Assume that the information in the chart defines a function with the name g. State the domain of g.

Month	Number
January	3500
February	3557
March	3541
April	3562

A) {3500, 3557, 3541, 3562}
B) {(January, 3500), (February, 3557), (March, 3541), (April, 3562)}
C) {(3500, January), (3557, February), (3541, March), (3562, April)}
D) {January, February, March, April}

Answer: D

83) This chart shows the number of meals served in a restaurant during each of the past 4 months. Assume that the information in the chart defines a function with the name g. State the range of g.

Month	Number
January	3500
February	3557
March	3541
April	3562

A) {(January, 3500), (February, 3557), (March, 3541), (April, 3562)}
B) {(3500, January), (3557, February), (3541, March), (3562, April)}
C) {3500, 3557, 3541, 3562}
D) {January, February, March, April}

Answer: C

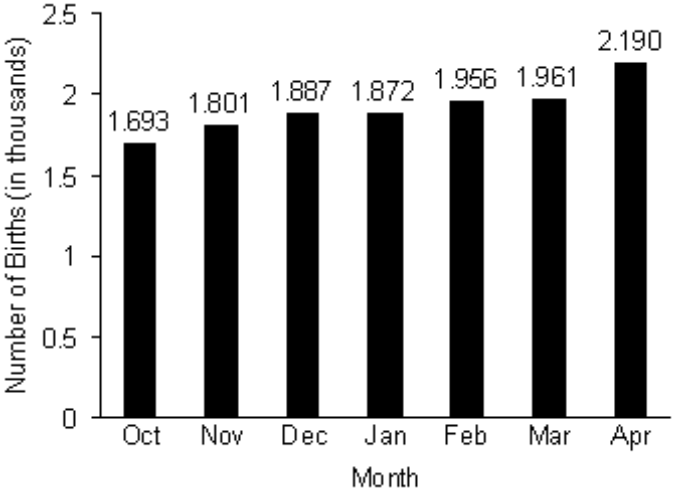
84) A store takes inventory of a popular clock at the end of each business day. The table below shows the number of clocks in stock during a 5-day period in which no new clocks were received from the distributor. What are the d and range of the function described by the table?

Day	# of clocks
1	23
2	16
3	12
4	11
5	7

A) Domain = [7, 23]; range = [1, 5]
B) Domain = [1, 5]; range = [7, 23]
C) Domain = {1, 2, 3, 4, 5}; range = {7, 11, 12, 16, 23}
D) Domain = {7, 11, 12, 16, 23}; range = {1, 2, 3, 4, 5}

Answer: C

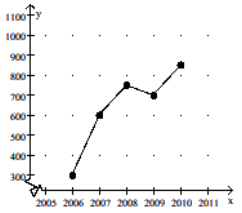
85) The number of births in a certain state is shown in the bar graph as a function of the month. What is the domain of this function?



A) {October, November, December, January, February, March, April}
B) {October, April}
C) {(October, 1693), (April, 2190)}
D) {1693, 1801, 1887, 1872, 1956, 1961, 2190}

Answer: A

86) Crafty Bill's Cool Car Sales opened as a used car sales lot in 2006. The graph shows the number of cars sold as a f of time. What is the domain of this function if we consider only the indicated points?



A) {2005, 2011}
B) {2005, 2006, 2007, 2008, 2009, 2010, 2011}
C) {2006, 2007, 2008, 2009, 2010}
D) {2006, 2010}

Answer: C

87) A box is to be made from a rectangular piece of cardboard by cutting a square from each corner and folding up the sides. The rectangular piece of cardboard is originally 28 inches long and 54 inches wide, and the squares removed from the corners are x inches wide. The volume of the box is given by the function $V = x(28 - 2x)(54 - 2x)$. What restrictions must be placed on x to satisfy the conditions of this model? In other words, what is the domain of this function?

A) $x > 14$
B) $0 < x < 27$
C) $0 < x < 14$
D) $x > 0$

Answer: C

88) This chart shows the fees for an 18-hole round of golf for each of the last 5 years at a local municipal golf course. Assume that this chart defines a function with the name of f. Find the value of x when f(x) = $23.

Year	Fee
2008	$20
2009	$23
2010	$25
2011	$25
2012	$30

A) 2011
B) 2012
C) 2010
D) 2009

Answer: D

89) This chart shows the number of meals served in a restaurant during each of the past 4 months. Assume that the information in the chart defines a function with the name g. For which x does g(x) = 1562?

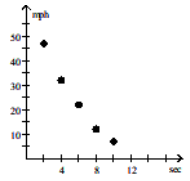
Month	Number
January	1500
February	1557
March	1541
April	1562

A) February
B) March
C) January
D) April

Answer: D

90) Suppose that the speed of a car, measured in miles per hour (mph), is monitored for some short period of time after the driver applies the brakes. The following table and graph relate the speed of the car to the amount of time, measured in seconds (sec), elapsed from the moment that the brakes are applied.

ELAPSED TIME (sec)	2	4	6	8	10
SPEED of CAR (mph)	47	32	22	12	7



What general trend do the data reflect? In which of the time intervals does the speed change the most?

A) With increasing elapsed time, the speed decreases. The speed changes most during the time interval from 8 seconds to 10 seconds.

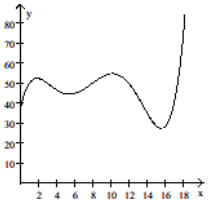
B) With increasing elapsed time, the speed decreases. The speed changes most during the time interval from 2 seconds to 4 seconds.

C) With increasing elapsed time, the speed increases. The speed changes most during the time interval from 2 seconds to 4 seconds.

D) With increasing elapsed time, the speed increases. The speed changes most during the time interval from 8 seconds to 10 seconds.

Answer: B

91) The following graph shows the stock price of a new internet company over the first 18 months after the initial public offering of its stock.



Stock Price (in dollars)

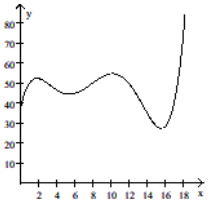
Month

How many months was the stock price $40 during the initial 18 month period?

A) 1 month B) 3 months C) 2 months D) 4 months

Answer: B

92) The following graph shows the stock price of a new internet company over the first 18 months after the initial public offering of its stock.



Stock Price
(in dollars)

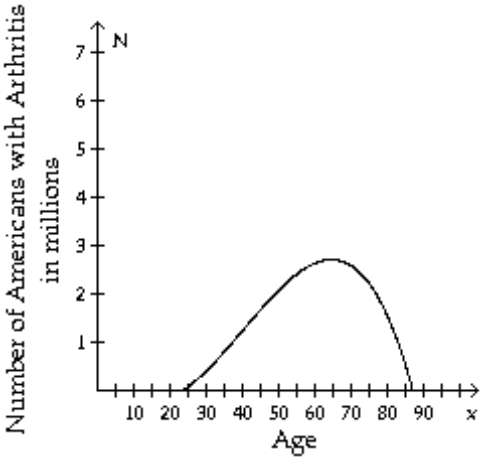
Month

Approximately in which month(s) did the stock price reach $70?

A) The 18th month
B) The 10th and 18th months
C) The 2nd and 10th months
D) The price never reached $70.

Answer: A

93) The number N, in millions of Americans of age x with arthritis, is estimated with the following graph.

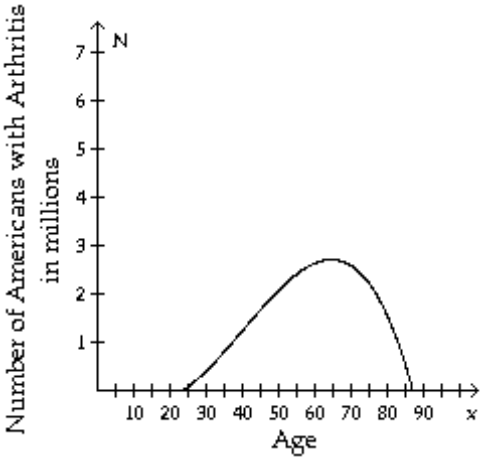


What approximate age (closest integer) has the most arthritic Americans?

A) 88
B) 65
C) 21
D) 60

Answer: B

94) The number N, in millions of Americans of age x with arthritis, is estimated with the following graph.

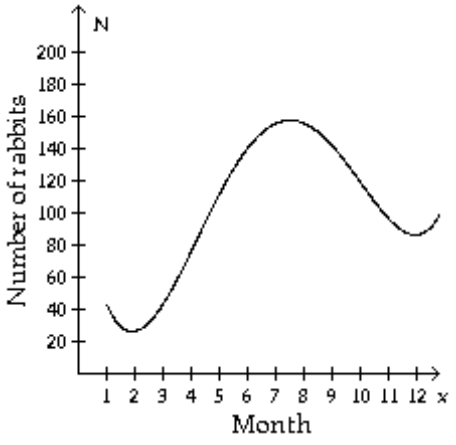


Give the age(s) at which there are 2 million people with arthritis.

A) 46 B) 45 and 65 C) 46 and 80 D) 35 and 80

Answer: C

95) The population of rabbits varies with the season due to migration, birth and death. The number, N, of rabbits during month x on a certain midwestern farm can be estimated with the following graph.

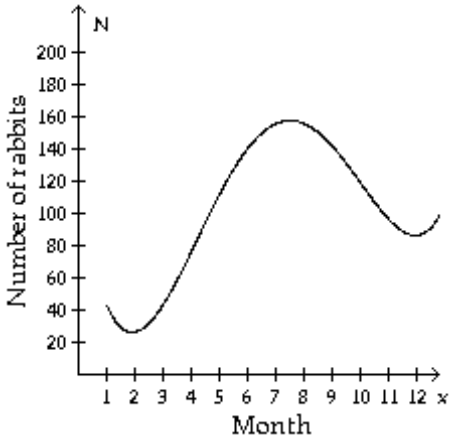


1=January, 2=February, and so on. What month has the least number of rabbits?

A) December B) February C) March D) January

Answer: B

96) The population of rabbits varies with the season due to migration, birth and death. The number, N, of rabbits during month x on a certain midwestern farm can be estimated with the following graph.

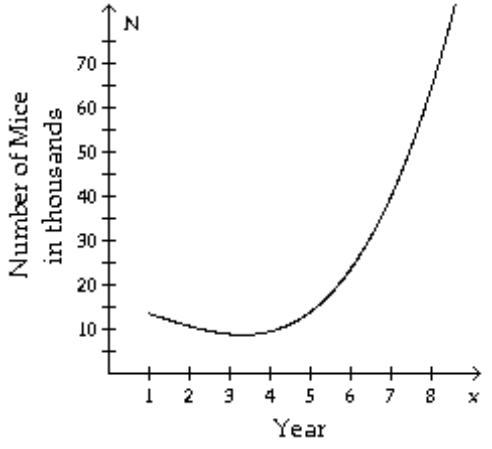


1=January, 2=February, and so on. During which months are there approximately 140 rabbits on the farm?

A) May and June
B) July and August
C) August and September
D) June and September

Answer: D

97) The population of a formerly endangered mouse is now on the rise. The population, N, over the last 8 years can be represented with the following graph:



When was the mice population the lowest?

A) Just after the end of the third year.
B) At the beginning of the 8 year period.
C) Just before the end of the second year.
D) During the fifth year.

Answer: A

98) This chart shows the fees for an 18-hole round of golf for each of the last 5 years at a local municipal golf course. Assume that this chart defines a function with the name of f. Find f(2010).

Year	Fee
2008	$22
2009	$24
2010	$26
2011	$26
2012	$28

A) $22 B) $28 C) $26 D) $24

Answer: C

99) This chart shows the number of meals served in a restaurant during each of the past 4 months. Assume that the information in the chart defines a function with the name g. Find g(March).

Month	Number
January	4000
February	4057
March	4041
April	4062

A) 4057 meals B) 4000 meals C) 4041 meals D) 4062 meals

Answer: C

100) The table lists the monthly precipitation P in Salem, Missouri, where x = 1 corresponds to January and x = 9 corresponds to September.

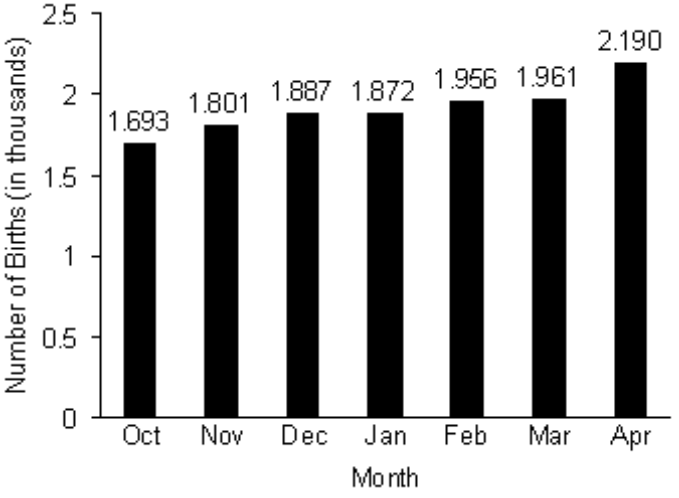
x (month)	1	2	3	4	5	6	7	8	9
P (in.)	1.2	1.5	0.6	1.3	2.3	2.1	1.6	0.7	1.4

Determine the value of P during September.

A) 2.4 inches B) 1.7 inches C) 1.2 inches D) 1.4 inches

Answer: D

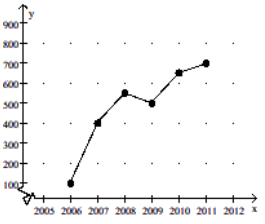
101) The bar graph below gives the number of births in a certain state for the months October to April, where t = 1 corresponds to October and t = 7 corresponds to April. If the number of births in thousands in this state is the function B(t), where t is in months, find B(4) and explain its meaning.



A) 1.887; In December, there were 1887 births in this state.
B) 1.872; In January, there were 1.872 births in this state.
C) 1.872; In January, there were 1872 births in this state.
D) 1.956; In February, there were 1956 births in this state.

Answer: C

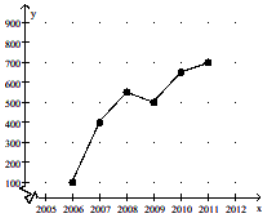
102) Crafty Bill's Cool Car Sales opened as a used car sales lot in 2006. The graph shows the number of cars sold as a f of time. What is the approximate number of cars sold in 2008?



A) 400 cars B) 550 cars C) 350 cars D) 500 cars

Answer: B

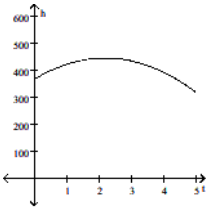
103) Crafty Bill's Cool Car Sales opened as a used car sales lot in 2006. The graph shows the number of cars sold f as a function of time t. Find and interpret f(2010).



A) 450; Crafty Bill's Cool Car Sales sold 450 cars in 2010.
B) 600; Crafty Bill's Cool Car Sales sold 600 cars in 2010.
C) 600; Crafty Bill's Cool Car Sales sold 600 cars in 2006.
D) 650; Crafty Bill's Cool Car Sales sold 650 cars in 2010.

Answer: D

104) The height h in feet of a projectile thrown upward from the roof of a building after time t seconds is shown in the graph below. Find and interpret h(0.6).



A) 375 ft; The projectile will be 375 feet above the roof of the building 0.6 seconds after it is thrown.
B) 400 ft; The projectile will be 400 feet above the ground 0.6 seconds after it is thrown.
C) 425 ft; The projectile will be 425 feet above the roof of the building 0.6 seconds after it is thrown.
D) 450 ft; The projectile will be 450 feet above the ground 0.6 seconds after it is thrown.

Answer: B

105) Employees of a publishing company received an increase in salary of 7% plus a bonus of $700. Let $S(x) = 1.07x + 700$ represent the new salary in terms of the previous salary x. Find and interpret S(13,000).

A) $13,700; If an employee's old salary was $13,000, then his/her new salary was $13,700 after the increase and bonus.
B) $11,495; If an employee's old salary was $11,495, then his/her new salary was $13,000 after the increase and bonus.
C) $14,610; If an employee's old salary was $13,000, then his/her new salary was $14,610 after the increase and bonus.
D) $22,800; If an employee's old salary was $22,800, then his/her new salary was $13,000 after the increase and bonus.

Answer: C

106) The function $E(x) = 0.0036x^3 + 0.0055x^2 + 0.19x + 1.76$ gives the approximate total earnings of a company, in millions of dollars, where x = 0 corresponds to 2006, x = 1 corresponds to 2007, and so on. This model is valid for the years from 2006 to 2010. Determine the earnings for 2007. Round to two decimal places if necessary.

A) $1.76 million B) $2.19 million C) $1.95 million D) $1.96 million

Answer: D

107) Suppose a cost-benefit model is given by $C(p) = \frac{5.8p}{100 - p}$, where C is the cost in thousands of dollars for removing p percent of a given pollutant. Find C(90) to the nearest dollar and interpret it.

A) $5800; It will cost $5800 to remove 0.90% of the pollutant.
B) $5220; It will cost $5220 to remove 0.90% of the pollutant.
C) $52,200; It will cost $52,200 to remove 90% of the pollutant.
D) $9000; It will cost $9000 to remove 90% of the pollutant.

Answer: C

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

108) Give a definition of Range.

Answer: The set of all values of the dependent variable (y).

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

109) Describe the graph of the function f(x) = x + 3 if the domain is {3, 4, 5, 6}.

A) The graph consists of the four points (3, 3), (4, 3), (5, 3), and (6, 3).
B) The graph consists of the four points (0, 6), (1, 7), (2, 8), and (3, 9).
C) The graph is a line through the four points (3, 6), (4, 7), (5, 8), and (6, 9).
D) The graph consists of the four points (3, 6), (4, 7), (5, 8), and (6, 9).

Answer: D

110) If the ordered pair (6, 2) belongs to function g, then g(___) = ___.

A) y; 6 B) 2; 6 C) x; 2 D) 6; 2

Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

111) Suppose the population of deer fluctuates over time. The population increases in the summer and decreases in the winter. It also varies over many years as well. If you looked at the graph of population versus time, would this relation be a function? Why or why not?

Answer: This would be a function because at any given time there is only one possible population. Despite the fact that the population can reach the same level several times this is still a function, but for each point in time, there can be no more than one population.

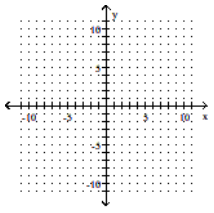
112) Consider the linear function f(x) = 5x + 20. What is the domain and range of this function? Now, suppose the function represents the relationship between studying time and grades on an exam. The variable x represents the number of hours spent studying and f(x) represents the grade on the exam. Does this change the domain and range? If so, what is the new domain and range and why is it different?

Answer: The domain is all real numbers and the range is the set of all real numbers. In the context of exam grades, the domain and range both become the set of nonnegative real numbers. In this context, times and grades less than zero do not make sense.

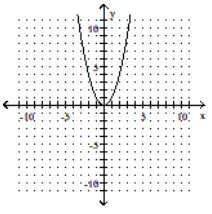
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Graph the function with a graphing utility.

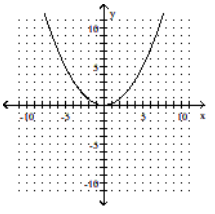
113) $y = 5x^2$



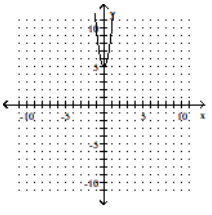
A)



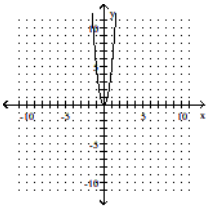
B)



C)

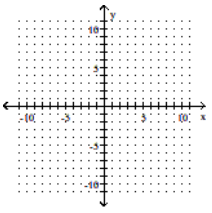


D)

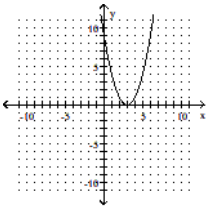


Answer: D

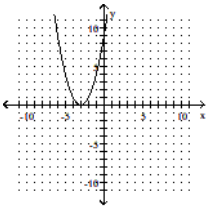
114) $y = x^2 + 3$



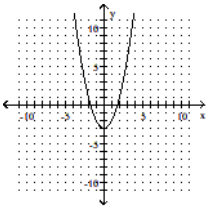
A)



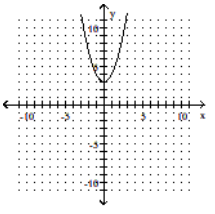
B)



C)

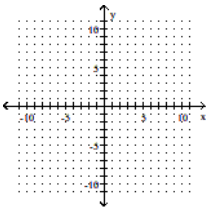


D)

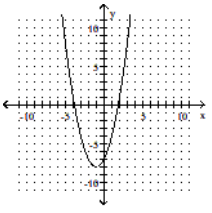


Answer: D

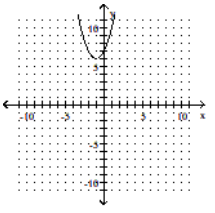
115) $y = x^2 + 2x - 7$



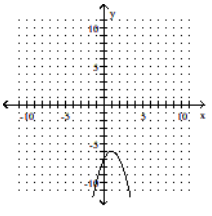
A)



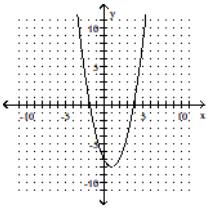
B)



C)

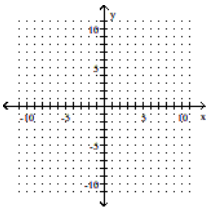


D)

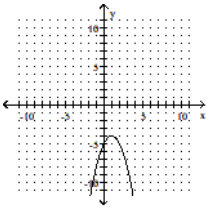


Answer: A

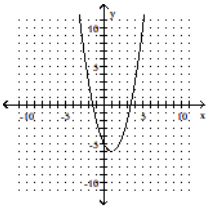
116) $y = -x^2 + 2x - 5$



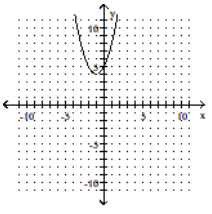
A)



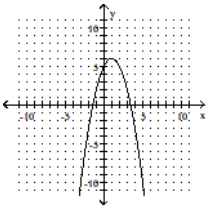
B)



C)

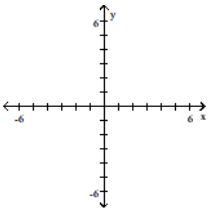


D)

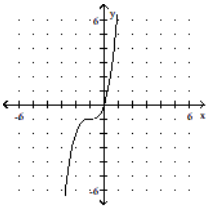


Answer: A

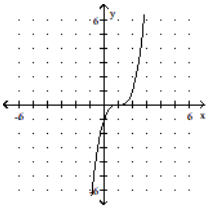
117) $y = x^3 - 1$



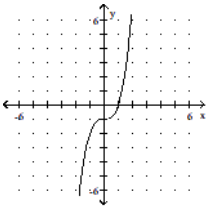
A)



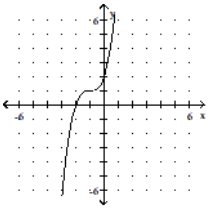
B)



C)

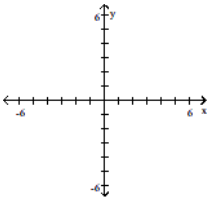


D)

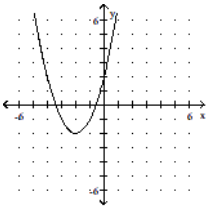


Answer: C

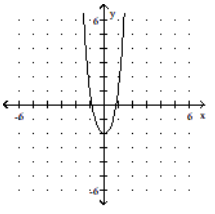
118) $y = x^4 + 2x^2 - 2$



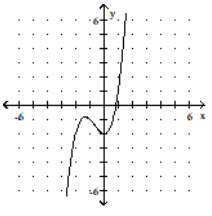
A)



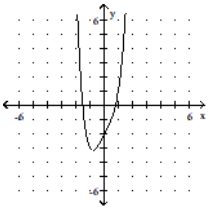
B)



C)

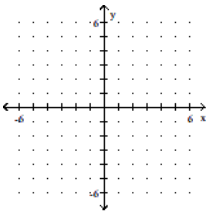


D)

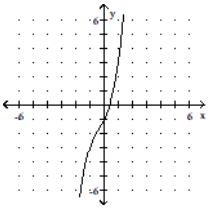


Answer: B

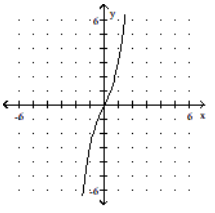
119) $y = x^3 + x^2 + 2x - 1$



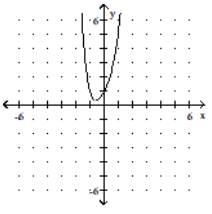
A)



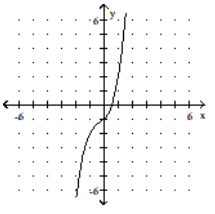
B)



C)

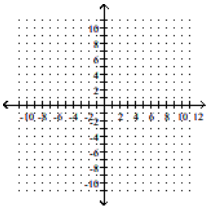


D)

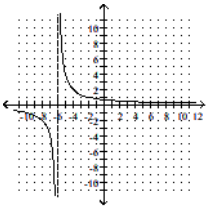


Answer: A

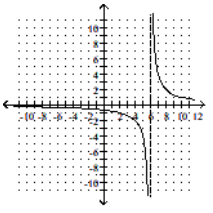
120) $y = \frac{-4}{x - 6}$



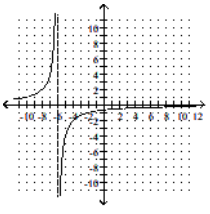
A)



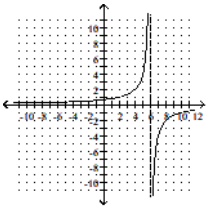
B)



C)

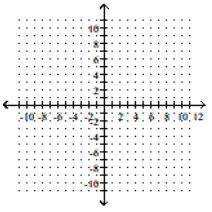


D)

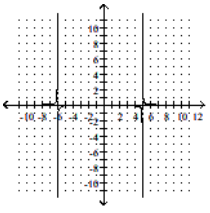


Answer: D

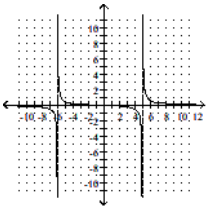
121) $y = \dfrac{x + 1}{x^2 + x - 30}$



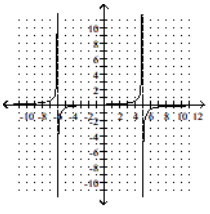
A)



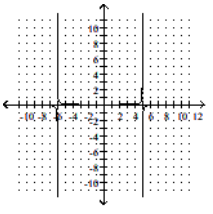
B)



C)



D)



Answer: B

Determine a viewing window that will provide a complete graph of the function.

122) $y = 3x^3 - 26x^2 + 18x - 47$

A) [-3, 10] by [-400, 100]
B) [-10, 10] by [-150, 150]
C) [-8, 10] by [-100, 300]
D) [-5, 5] by [-500, 100]

Answer: A

123) $y = 0.62x^3 - 5x^2 + 11x + 8$

A) [-10, 1] by [-75, 100]
B) [-3, 8] by [-50, 50]
C) [-2, 1] by [-30, 20]
D) [-2, 7] by [-100, 60]

Answer: B

124) $y = 4.5x^3 + 12x^2 - 82$

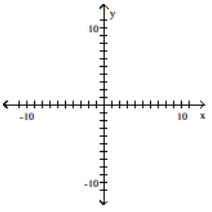
A) [-100, 100] by [-10, 10]
B) [-5, 5] by [-200, 50]
C) [-6, 6] by [-50, 100]
D) [-2, 1] by [-100, 50]

Answer: B

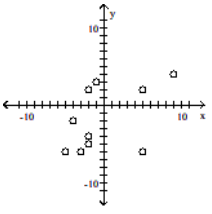
Graph the scatter plot of the data.

125)

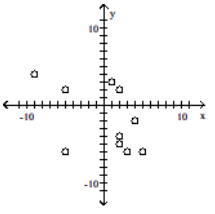
x	5	-2	-2	-3	5	-1	-5	9	-4	-2
y	-6	-4	2	-6	2	3	-6	4	-2	-5



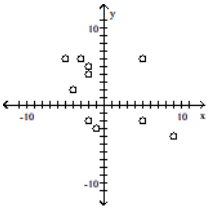
A)



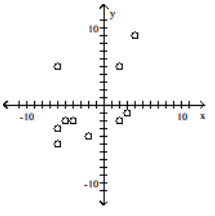
B)



C)



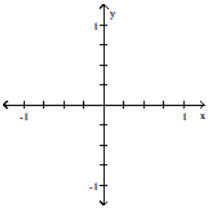
D)



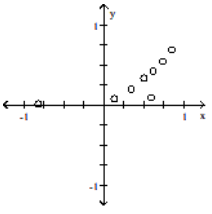
Answer: A

126)

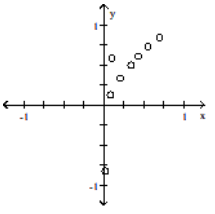
x	0.55	0.34	0.43	0.2	0.02	0.1	0.69	0.08
y	0.73	0.5	0.61	0.34	-0.82	0.59	0.85	0.13



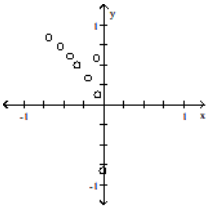
A)



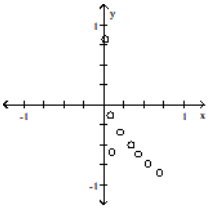
B)



C)



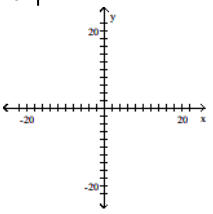
D)



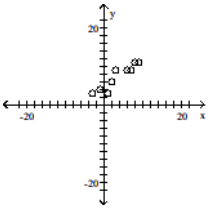
Answer: B

127)

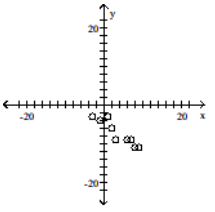
x	-3	3	8	9	7	6	2	-1	1
y	3	9	11	11	9	9	6	4	3



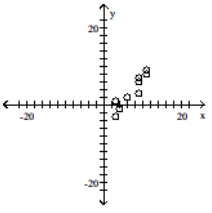
A)



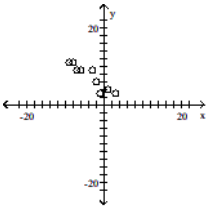
B)



C)



D)



Answer: A

Solve the problem.

128) Suppose the sales of a particular brand of appliance are modeled by the linear function S(x) = 50x + 300, where S(x) represents the number of sales in year x, with x = 0 corresponding to 2002. Use this model to predict the number of sales in 2017.

A) 2050 sales B) 2100 sales C) 1050 sales D) 1000 sales

Answer: C

129) The mathematical model C(x) = 200x + 50,000 represents the cost in dollars a company has in manufacturing x items during a month. Based on this, how much does it cost to produce 500 items?

A) $250.00 B) $150,000 C) $0.50 D) $100,000

Answer: B

130) The polynomial $0.0032x^3 - 0.0058x^2 + 0.131x + 1.41$ gives the approximate total earnings of a company, in millions of dollars, where x = 0 corresponds to 2008, x = 1 corresponds to 2009, and so on. This model is valid for the years from 2008 to 2012. Determine the earnings for 2012. Round your answer to the nearest hundredth million.

A) $1.84 million B) $2.32 million C) $2.05 million D) $2.23 million

Answer: C

131) The polynomial $0.0034x^4 + 0.0047x^3 + 0.0053x^2 + 0.17x + 1.73$ gives the predicted sales volume of a company, in millions of items, where x is the number of years from now. Determine the predicted sales 18 years from now. Round your answer to the nearest hundredth million.

A) $390.84 million B) $358.01 million C) $538.53 million D) $386.41 million

Answer: A

132) A cellular phone company determines a monthly bill from the x number of minutes of usage. The amount of the bill, B(x), (in dollars) is given by the function: B(x) = 29.95 + 0.11x. Determine the bill of a customer who uses her cellular phone 32.00 minutes during the month.

A) $33.47 B) $3.52 C) $961.92 D) $32.00

Answer: A

133) A small toy company that only makes action figures is owned by its stockholders. The dividend per share of stock is a function of the number of action figures it sells and is defined by $D(x) = \frac{\$4.46x - \$270}{3949}$, where x is the number of action figures sold. What is the dividend for each share of stock if 1350 action figures are sold?

A) $1.59 B) $1.46 C) -$268.48 D) -$1.46

Answer: B

134) It has been determined that the number of fish f(t) that can be caught in t minutes in a certain pond using a certain bait is f(t) = 0.28t + 1, for t > 10. Find and interpret f(11). Round your answer to the nearest whole number.

A) 9; Approximately 9 fish can be caught in this pond with this bait in 11 minutes.
B) 9; Approximately 11 fish can be caught in this pond with this bait in 9 minutes.
C) 4; Approximately 11 fish can be caught in this pond with this bait in 4 minutes.
D) 4; Approximately 4 fish can be caught in this pond with this bait in 11 minutes.

Answer: D

135) The function $P(d) = 1 + \frac{d}{33}$ gives the pressure, in atmospheres (atm), at a depth d feet in the sea. Find and interpret P(47). Do not round your answer.

A) $\frac{47}{33}$; At a depth of 47 feet, the pressure is $\frac{47}{33}$ atm.

B) $\frac{80}{33}$; At a depth of $\frac{80}{33}$ feet, the pressure is 47 atm.

C) $\frac{47}{33}$; At a depth of $\frac{47}{33}$ feet, the pressure is 47 atm.

D) $\frac{80}{33}$; At a depth of 47 feet, the pressure is $\frac{80}{33}$ atm.

Answer: D

136) The distance an object is from the ground after being tossed from a hot air balloon 770 feet in the air is a function of time and given by $h(t) = -16.1t^2 + 5.7t + 770$, where h is height in feet and t is the number of seconds the object has been in the air. Find h(5.5) and explain its meaning.

A) 314.33 feet; After the object has been in the air 5.5 seconds, it is 314.33 feet above the ground.
B) 712.80 feet; After the object has been in the air 712.80 seconds, it is 5.5 feet above the ground.
C) 251.63 feet; After the object has been in the air 5.5 seconds, it is 251.63 feet above the ground.
D) 712.80 feet; After the object has been in the air 5.5 seconds, it is 314.33 feet above the ground.

Answer: A

137) The function F described by $F(C) = \frac{9}{5}C + 32$ gives the Fahrenheit temperature corresponding to the Celsius temperature C. Find and interpret F(-20).

A) -112°F; A temperature of -20°C is equivalent to -112°F.
B) -4°F; A temperature of -20°C is equivalent to -4°F.
C) -4°F; A temperature of -4°C is equivalent to -20°F.
D) -40°F; A temperature of -20°C is equivalent to -40°F.

Answer: B

Use a graphing utility to graph the function and then answer the question.

138) The number of mosquitoes M(x), in millions, in a certain area depends on the June rainfall x, in inches: $M(x) = 4x - x^2$. What rainfall produces the maximum number of mosquitoes?

A) 16 in. B) 4 in. C) 0 in. D) 2 in.

Answer: D

139) John owns a hotdog stand. He has found that his profit is represented by the equation $P = -x^2 + 54x + 73$, with P being profits and x the number of hotdogs. How many hotdogs must he sell to earn the most profit?

A) 46 hotdogs B) 27 hotdogs C) 28 hotdogs D) 23 hotdogs

Answer: B

140) The polynomial function $I(t) = -0.1t^2 + 1.3t$ represents the yearly income (or loss) from a real estate investment, where t is time in years. After what year does income begin to decline?

A) 13 B) 5.5 C) 8.67 D) 6.5

Answer: D

Provide an appropriate response.

141) Decide if the window $[-7, 18]$ by $[-4, 34]$ shows a complete graph of the function $f(x) = -2x - 19$.

A) Yes B) No

Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

142) Find an appropriate viewing window for the function $y = x^2 - 23$, for x-values between -10 and 10.

Answer: Answers may vary. A possible answer is $y_{min} = -46$ and $y_{max} = 0$.

143) Which window gives a better view of the graph of the function $y = (x + 15)^3$:

$x_{min} = -10$, $x_{max} = 10$, $y_{min} = -10$, $y_{max} = 10$ or

$x_{min} = -17$, $x_{max} = -13$, $y_{min} = -10$, $y_{max} = 10$

Answer: The window $x_{min} = -17$, $x_{max} = -13$, $y_{min} = -10$, $y_{max} = 10$ gives a better view of the graph of the function.

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

Decide if the function is linear.

144) $y = 2x^2 - 3$

A) No B) Yes

Answer: A

145) $4x + 2y = 3$

A) No B) Yes

Answer: B

146) $y = \frac{x}{8} + 2$

A) No B) Yes

Answer: B

147) $y = 4x + 9$

A) No B) Yes

Answer: B

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

A) Yes B) No

Answer: B

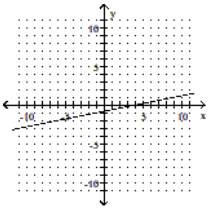
149) $y = 2x^3 + 8$

A) Yes B) No

Answer: B

Determine if the graph represents a function.

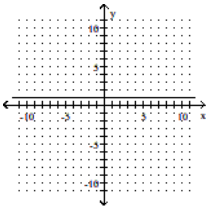
150)



A) Yes B) No

Answer: A

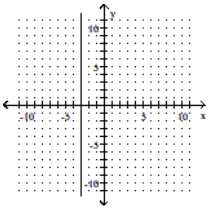
151)



A) Yes B) No

Answer: A

152)



A) Yes B) No

Answer: B

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

153) (-5, -6) and (-3, 1)

A) $-\frac{7}{2}$ B) $\frac{2}{7}$ C) $-\frac{2}{7}$ D) $\frac{7}{2}$

Answer: D

154) (7, -3) and (-5, 6)

A) $\frac{4}{3}$ B) $\frac{3}{4}$ C) $-\frac{4}{3}$ D) $-\frac{3}{4}$

Answer: D

155) (-1, -6) and (7, -3)

A) $\frac{8}{3}$ B) $-\frac{3}{8}$ C) $\frac{3}{8}$ D) $-\frac{8}{3}$

Answer: C

156) (-3, -7) and (2, -8)

A) 5 B) $\frac{1}{5}$ C) - 5 D) $-\frac{1}{5}$

Answer: D

157) (7, -6) and (7, -1)

A) 0 B) 5 C) -5 D) Undefined

Answer: D

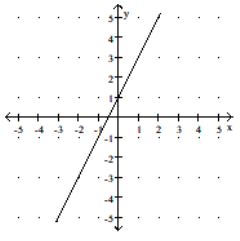
158) (-7, 3) and (2, 3)

A) 9 B) Undefined C) 0 D) -9

Answer: C

Find the slope of the line.

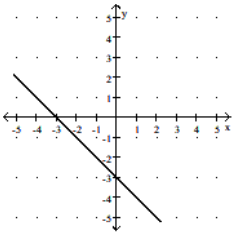
159)



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

Answer: A

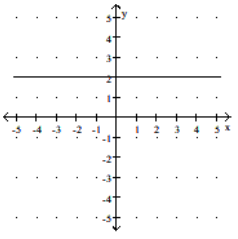
160)



A) -1 B) 3 C) 1 D) -3

Answer: A

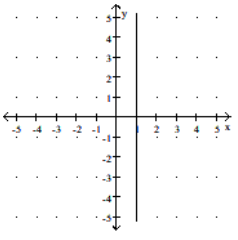
161)



A) undefined B) 0 C) -2 D) 2

Answer: B

162)

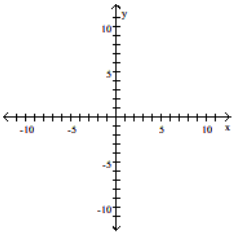


A) -3 B) 3 C) 0 D) undefined

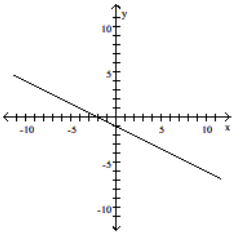
Answer: D

Find the x- and y-intercepts of the graph of the given equation, if they exist. Then graph the equation.

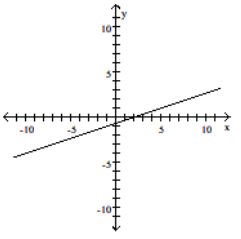
163) $9y - 3x = -6$



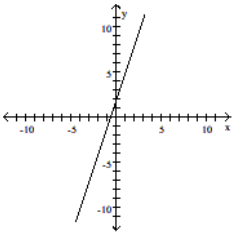
A) x: -2; y: $-\frac{2}{3}$



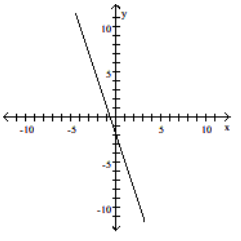
B) x: 2; y: $-\frac{2}{3}$



C) x: $-\frac{2}{3}$; y: 2

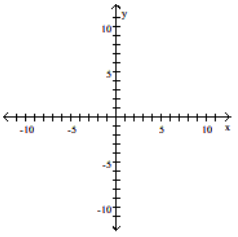


D) x: $-\frac{2}{3}$; y: -2

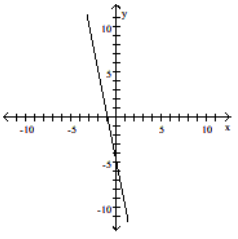


Answer: B

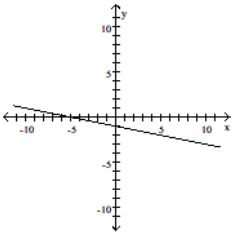
164) -4x - 20y = 20



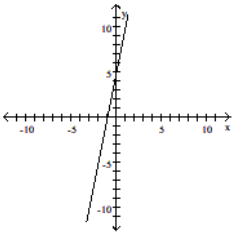
A) x: -1; y: -5



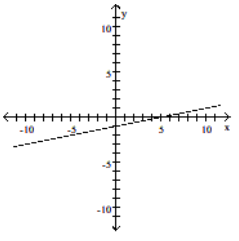
B) x: -5; y: -1



C) x: -1; y: 5

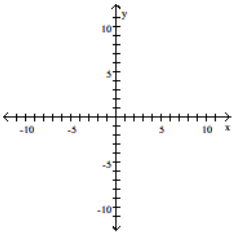


D) x: 5; y: -1

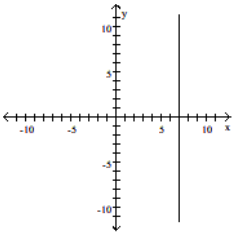


Answer: B

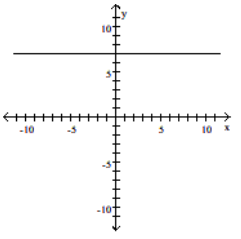
165) y = 7



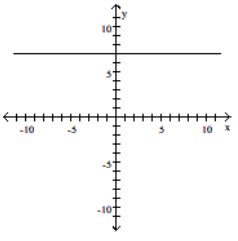
A) x: 7; y: none



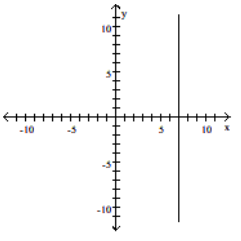
B) x: none; y: 7



C) x: 7; y: none

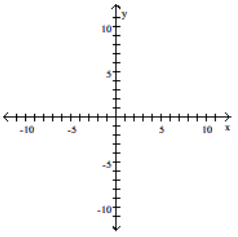


D) x: none; y: 7

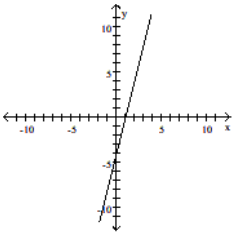


Answer: B

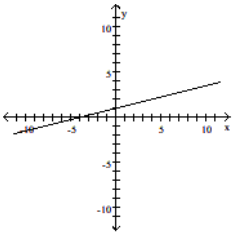
166) 5x - 20y = 20



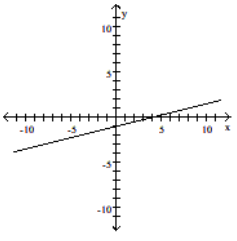
A) x: 1; y: -4



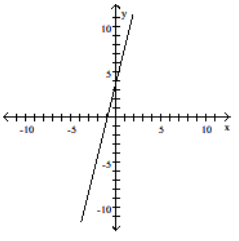
B) x: -4; y: 1



C) x: 4; y: -1

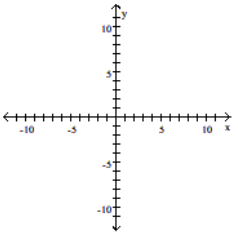


D) x: -1; y: 4

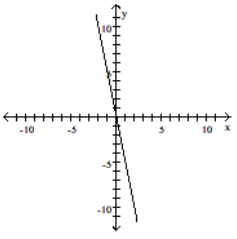


Answer: C

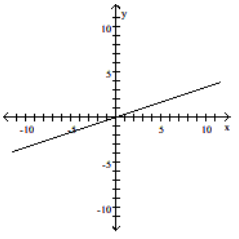
167) 5x - 15y = 0



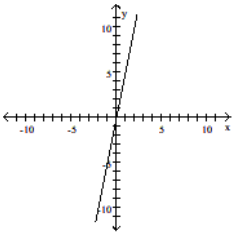
A) x: 0; y: 0



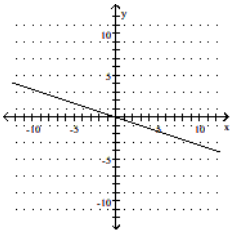
B) x: 0; y: 0



C) x: 0; y: 0

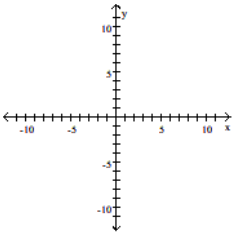


D) x: 0; y: 0

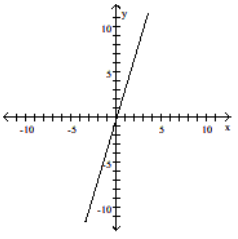


Answer: B

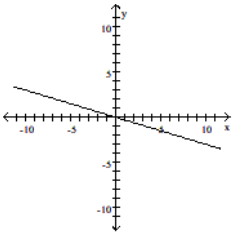
168) $2y = \frac{3}{5}x$



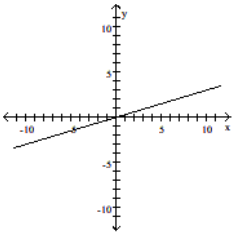
A) x: 0; y: 0



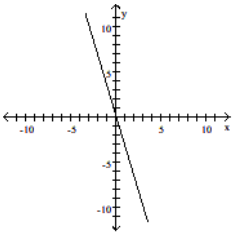
B) x: 0; y: 0



C) x: 0; y: 0

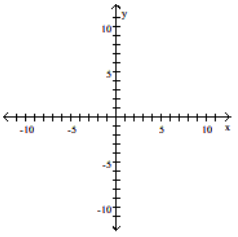


D) x: 0; y: 0

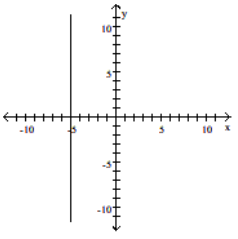


Answer: C

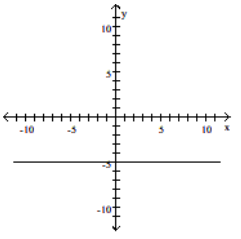
169) x = -5



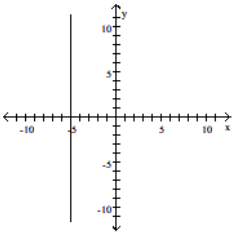
A) x: -5; y: none



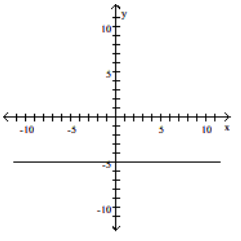
B) x: -5; y: none



C) x: none; y: -5

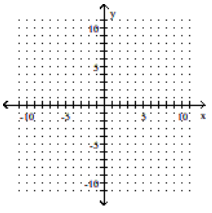


D) x: none; y: -5

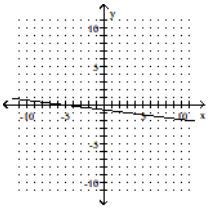


Answer: A

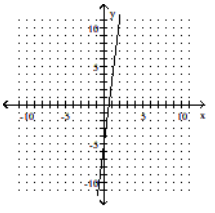
170) 8x - 5 = y



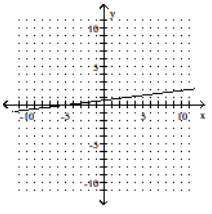
A) x: -5; y: $-\frac{5}{8}$



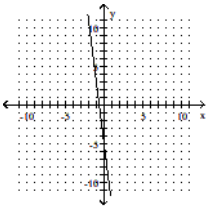
B) x: $\frac{5}{8}$; y: -5



C) x: -5; y: $\frac{5}{8}$

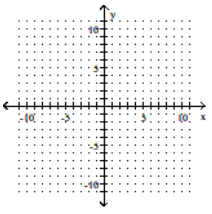


D) x: $-\frac{5}{8}$; y: -5

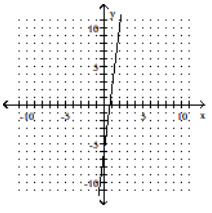


Answer: B

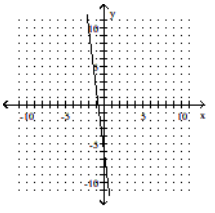
171) y = -6 - 8x



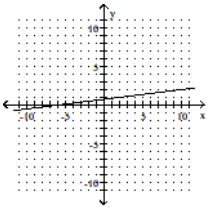
A) x: $\frac{3}{4}$; y: -6



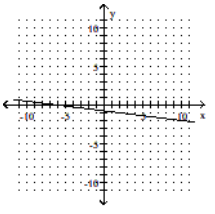
B) x: $-\frac{3}{4}$; y: -6



C) x: -6; y: $\frac{3}{4}$

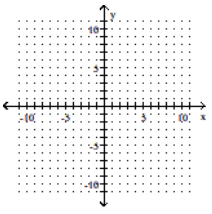


D) x: -6; y: $-\frac{3}{4}$

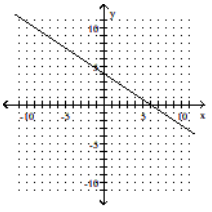


Answer: B

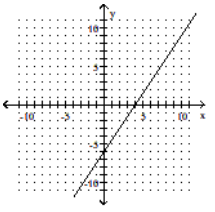
172) $4y = -24 + 6x$



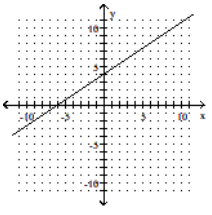
A) x: 6; y: 4



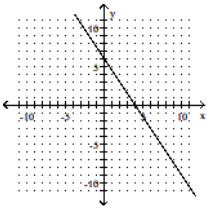
B) x: 4; y: -6



C) x: -6; y: 4



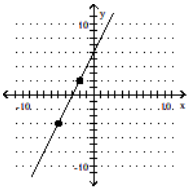
D) x: 4; y: 6



Answer: B

Decide whether the slope is positive, negative, zero, or undefined.

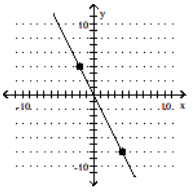
173)



A) Undefined B) Negative C) Zero D) Positive

Answer: D

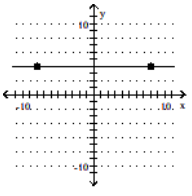
174)



A) Positive B) Undefined C) Negative D) Zero

Answer: C

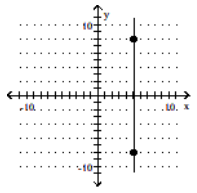
175)



A) Positive B) Undefined C) Zero D) Negative

Answer: C

176)



A) Positive B) Negative C) Zero D) Undefined

Answer: D

Find the slope of the line (if it exists) and the y-intercept (if it exists).

177) y = 9x + 8

A) Slope -9, y-intercept (0, 8)
B) Slope 9, y-intercept (0, 8)
C) Slope 8, y-intercept (0, -9)
D) Slope 8, y-intercept (0, 9)

Answer: B

178) y = -5x + 9

A) Slope -5, y-intercept (0, 9)
B) Slope 9, y-intercept (0, 5)
C) Slope 5, y-intercept (0, 9)
D) Slope 9, y-intercept (0, -5)

Answer: A

179) y = -1.8x - 5.4

A) Slope 1.8, y-intercept (0, -5.4)
B) Slope -5.4, y-intercept (0, -1.8)
C) Slope -1.8, y-intercept (0, -5.4)
D) Slope -1.8, y-intercept (0, 5.4)

Answer: C

180) y = 3.3x - 2

A) Slope -2, y-intercept (0, -3.3)
B) Slope -3.3, y-intercept (0, -2)
C) Slope -2, y-intercept (0, 3.3)
D) Slope 3.3, y-intercept (0, -2)

Answer: D

181) 3x - 9y = -18

A) Slope -3, y-intercept (0, 2)
B) Slope $-\frac{1}{3}$, y-intercept (0, -2)
C) Slope $\frac{1}{3}$, y-intercept (0, 2)
D) Slope 3, y-intercept (0, -2)

Answer: C

182) 4x - 6y = -6

A) Slope $\frac{3}{2}$, y-intercept (0, -1)
B) Slope $-\frac{3}{2}$, y-intercept (0, 1)
C) Slope $-\frac{2}{3}$, y-intercept (0, -1)
D) Slope $\frac{2}{3}$, y-intercept (0, 1)

Answer: D

183) 3y = 21

A) Slope 0; y-intercept (7, 0)
B) Slope undefined; y-intercept (7, 0)
C) Slope undefined; y-intercept (0, 7)
D) Slope 0; y-intercept (0, 7)

Answer: D

184) 3x = 15

A) Slope undefined; no y-intercept
B) Slope undefined; y-intercept (0, 5)
C) Slope 0; no y-intercept
D) Slope 0; y-intercept (0, 5)

Answer: A

185) y = 8 + 3x

A) Slope 8; y-intercept (0, 3)
B) Slope 3; y-intercept (0, 8)
C) Slope -8; y-intercept (0, 3)
D) Slope -3; y-intercept (0, 8)

Answer: B

For the given function, find the rate of change.

186) y = 3x + 6

A) 3
B) -3
C) 6
D) -6

Answer: A

187) y = 700 - 6x

A) 700
B) 5
C) -6
D) 6

Answer: C

188) $y = 3 + \frac{1}{9}x$

A) $\frac{1}{9}$
B) 3
C) 9
D) $\frac{1}{3}$

Answer: A

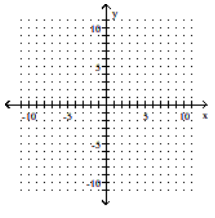
189) y = -700x + 6

A) 700
B) -700
C) 6
D) - 6

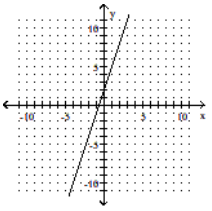
Answer: B

Graph the equation.

190) y = 3x + 2



A)



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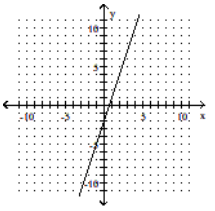
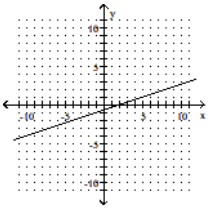
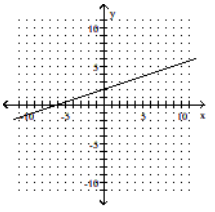


C)

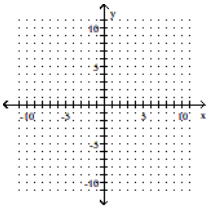


D)

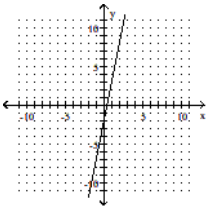


Answer: A

191) $y = \frac{1}{5}x - 2$



A)



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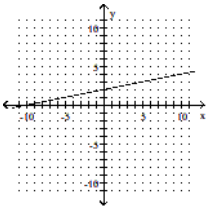

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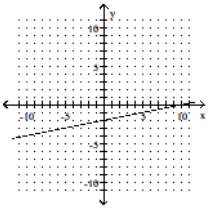
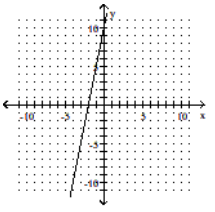
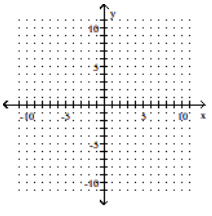


D)

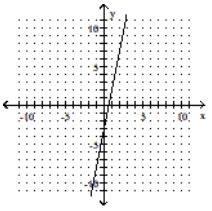


Answer: C

192) 5y = x - 3



A)



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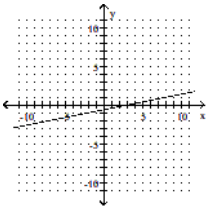

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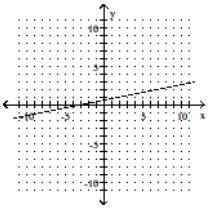
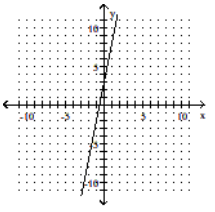
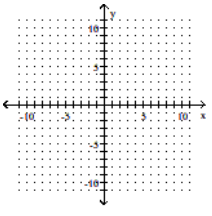


D)

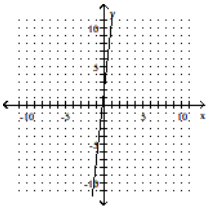


Answer: B

193) -x = -9y + 2



A)



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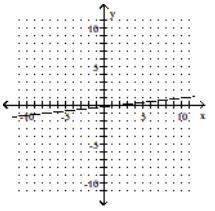

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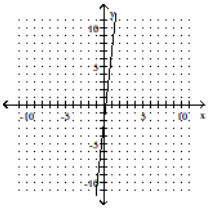
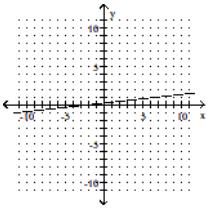
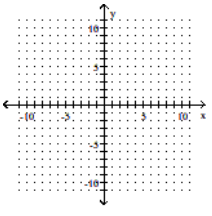


D)

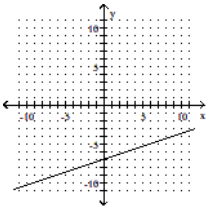


Answer: D

194) 3y + 9x = -21



A)



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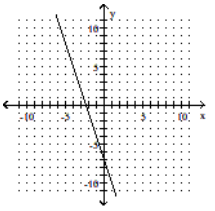

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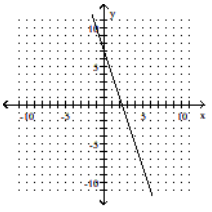
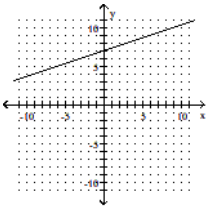
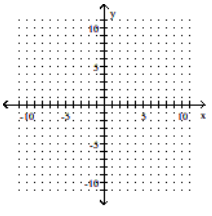


D)

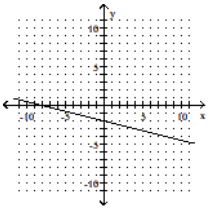


Answer: B

195) 4x = y + 2



A)



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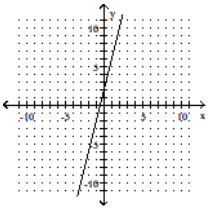

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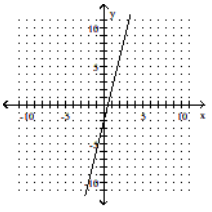
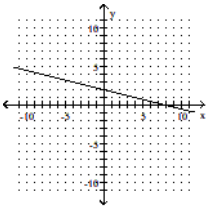
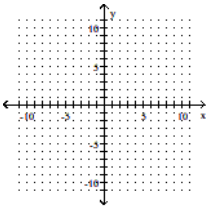


D)

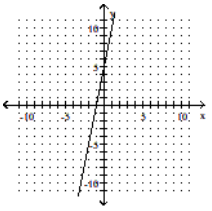


Answer: C

196) 25y = 5x + 25



A)



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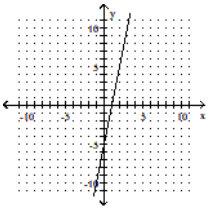

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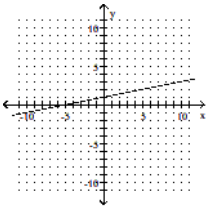
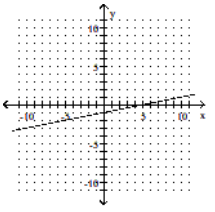
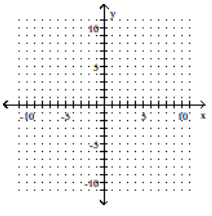


D)

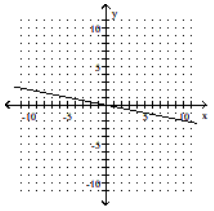


Answer: C

197) -5x - y = 0



A)



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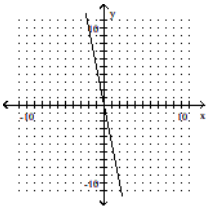
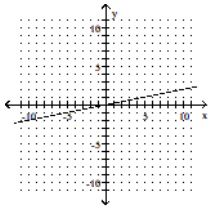
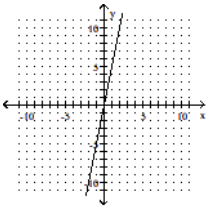


C)

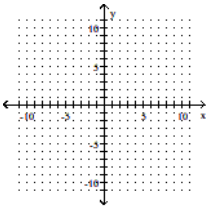


D)

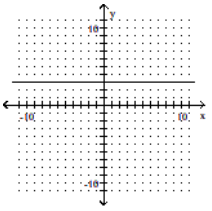


Answer: B

198) y = -3



A)



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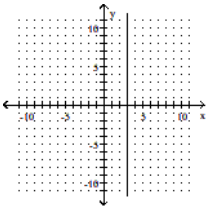
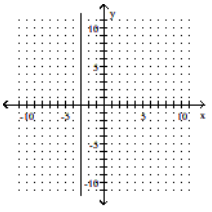
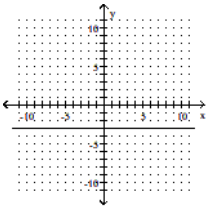


C)

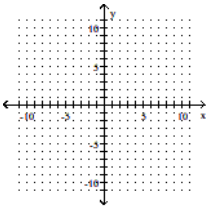


D)

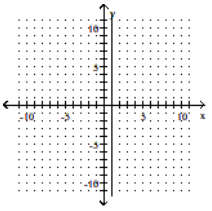


Answer: D

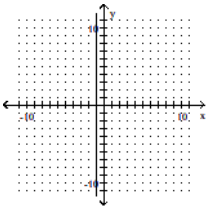
199) x = 1



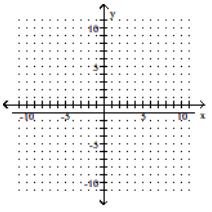
A)



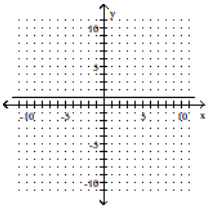
B)



C)



D)



Answer: A

Solve the problem.

200) Let y = -9x + 221 represent the number of students present in a large class, where x represents the number of hours of study required weekly. What is the rate of change of the number of students in the class with respect to the number of hours of study?

A) 9 students per hour of study time
B) -221 students per hour of study time
C) 221 students per hour of study time
D) -9 students per hour of study time

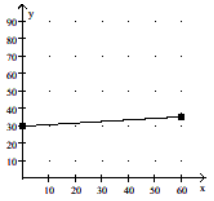
Answer: D

201) A boat is moving away from shore in such a way that at time t hours its distance from shore, in kilometers, is given by the linear function d(t) = 4.5t + 9.1. What is the rate of change of the distance from shore?

A) 4.5 m/s
B) 9.1 m/s
C) 4.5 km/hr
D) 9.1 km/hr

Answer: C

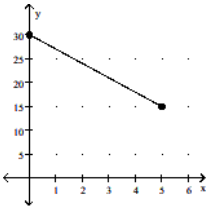
202) Find the rate of change. Use appropriate units.



A) $0.08 per minute B) $0.86 per minute C) $1.83 per minute D) $12.00 per minute

Answer: A

203)



Find the rate of change. Use appropriate units.

A) $4000 per year B) $3000 per year C) -$4000 per year D) -$3000 per year

Answer: D

204) The cost of a rental car for the weekend is given by the function C(x) = 146 + 0.25x, where x is the number of miles driven. Find the slope of the graph of this function and interpret it as a rate of change.

A) 0.25; The cost of the rental car decreases by $0.25 for each mile driven.
B) 146; The cost of the rental car increases by $146 for each mile driven.
C) 146; The cost of the rental car decreases by $0.25 for each mile driven.
D) 0.25; The cost of the rental car increases by $0.25 for each mile driven.

Answer: D

205) The cost of tuition at a community college is given by C(x) = 490 + 54x, where x is the number of credit hours. Interpret the slope of this function as a rate of change.

A) The tuition at the community college increases by $490 for each additional credit hour.
B) The tuition at the community college increases by $490 for each additional 54 credit hours.
C) The number of credit hours increases by 54 for each increase of $490 in tuition.
D) The tuition at the community college increases by $54 for each additional credit hour.

Answer: D

206) In a certain town the annual consumption, b, of beef (in pounds per person) can be estimated by b = 35 - 0.4t, where t is the number of years since 2010. What is the slope of the graph of this function? Write a sentence interpreting this value.
A) 35; The average consumption of beef in this town is decreasing by 35 pounds per person per year.
B) -0.4; The average consumption of beef in this town is increasing by 0.4 pounds per person per year.
C) 35; The average consumption of beef in this town is increasing by 35 pounds per person per year.
D) -0.4; The average consumption of beef in this town is decreasing by 0.4 pounds per person per year.

Answer: D

207) The population of a small town can be modeled by P = -33t + 12,800, where t is the number of years since 2010. Interpret the slope of the graph of this function as a rate of change.
A) The population of the town is decreasing by 33 people per year.
B) The population of the town is decreasing by 12,800 people per year.
C) The population of the town is increasing by 12,800 people per year.
D) The population of the town is increasing by 33 people per year.

Answer: A

208) The percent p of high school students who participate in sports at a public high school can be modeled by 10p - 16x = 224,where x is the number of years after 2010. Interpret the slope as a rate of change if x is the independent variable.
A) The percent of high school students who participate in sports at this school is decreasing by 1.6 percent per year.
B) The percent of high school students who participate in sports at this school is increasing by 16 percent per year.
C) The percent of high school students who participate in sports at this school is decreasing by 16 percent per year.
D) The percent of high school students who participate in sports at this school is increasing by 1.6 percent per year.

Answer: D

Determine whether or not the function is linear. If it is, determine the slope and interpret it.

209) The population of a small town is given by P(t) = 59t + 12,350, where t is the number of years past 2010.
A) Not linear
B) Linear; 59; Each year since 2010, the population decreased by 59 people.
C) Linear; 59; Each year since 2010, the population increased by 59 people.
D) Linear; 12,350; Each year since 2010, the population increased by 12,350 people.

Answer: C

210) The value of a particular car is given by V(t) = 22,000 - 3200t, where t is the age of the car in years.
A) Linear; 3200; Each year, the car depreciates $3200.
B) Not linear
C) Linear; 3200; Each year, the car appreciates $3200.
D) Linear; 22,000; Each year, the car depreciates $22,000.

Answer: A

211) The cost of tuition at a community college is given by C(x) = 467 + 69x, where x is the number of credit hours.
A) Not linear
B) Linear; 69; The cost of tuition increases $69 for each additional credit hour.
C) Linear; 69; The cost of tuition decreases $69 for each additional credit hour.
D) Linear; 467; The cost of tuition increases $467 for each additional credit hour.

Answer: B

212) The height of an object t seconds after being dropped from an altitude of 249 feet is given by the function $h(t) = -16t^2 + 249$.
A) Not linear
B) Linear; -16; The height of the object decreases 16 feet each passing second.
C) Linear; 249; The height of the object decreases 249 feet each passing second.
D) Linear; -16; The height of the object increases 16 feet each passing second.

Answer: A

Solve the problem.

213) The cost of a rental car for the weekend is given by the function C(x) = 137 + 0.25x, where x is the number of miles driven. Find and interpret the C-intercept of the graph of this function.
A) 137; The cost of the rental car increases by $137 for each mile driven.
B) 0.25; The cost of the rental car increases by $0.25 for each mile driven.
C) 137; There is a flat rate of $137 to rent a car in addition to the charge for each mile driven.
D) 0.25; There is a flat rate of $0.25 to rent a car in addition to the charge for each mile driven.

Answer: C

214) The cost of tuition at a community college is given by C(x) = 485 + 68x, where x is the number of credit hours. Find and interpret the C-intercept of the graph of this function.
A) 485; There is a tuition fee of $485 in addition to the charge per credit hour.
B) 68; There is a tuition fee of $68 in addition to the charge per credit hour.
C) 485; The tuition increases by $485 for each additional credit hour.
D) 68; The tuition increases by $68 for each additional credit hour.

Answer: A

215) In a certain town the annual consumption, b, of beef (in pounds per person) can be estimated by b = 34 - 0.5t, where t is the number of years since 2010. Find and interpret the t-intercept of the graph of this function.
A) 34; If this trend continues, the annual consumption of beef in this town will be zero pounds per person in the year 2078.
B) 34; The annual consumption of beef in this town was zero pounds per person in 2010.
C) 68; If this trend continues, the annual consumption of beef in this town will be zero pounds per person in the year 2078.
D) 68; The annual consumption of beef in this town was 68 pounds per person in 2010.

Answer: C

216) In a certain town the annual consumption, b, of beef (in pounds per person) can be estimated by b = 36 - 0.5t, where t is the number of years since 2010. Find and interpret the b-intercept of the graph of this function.
A) 36; The annual consumption of beef in this town was 36 pounds per person in 2010.
B) 72; The annual consumption of beef in this town was 72 pounds per person in 2010.
C) 72; If this trend continues, the annual consumption of beef in this town will be zero pounds per person in the year 2082.
D) 36; If this trend continues, the annual consumption of beef in this town will be zero pounds per person in the year 2046.

Answer: A

217) The population of a small town can be modeled by P = -32t + 13,500, where t is the number of years since 2010. Interpret the P-intercept of the graph of this function.
A) The population of the town is increasing by 32 people per year.
B) The population of the town was 13,500 in 2010.
C) The population of the town was 32,000 in 2010.
D) The population of the town is decreasing by 32 people per year.

Answer: B

218) The percent p of high school students who participate in sports at a public high school can be modeled by 10p - 24x = 196,where x is the number of years after 2010. Interpret the p intercept of the graph of this function.
A) In 2010, 19.6% of the high school students at this school participated in sports.
B) The percent of high school students who participate in sports at this school is increasing 2.4 percent per year.
C) In 2010, 28.8% of the high school students at this school participated in sports.
D) The percent of high school students who participate in sports at this school is increasing 19.6 percent per year.

Answer: A

219) The cost of manufacturing a molded part is related to the quantity produced during a production run. When 100 parts are produced, the cost is $300. When 400 parts are produced, the cost is $2700. What is the marginal cost of the function?
A) $8.00 per part B) $9.00 per part C) $6.00 per part D) $0.13 per part

Answer: A

220) The relationship between the number of units sold by a company and the profit is linear. If 5 units sold results in $110 profit and 37 units sold results in $814 profit, find the marginal profit.
A) -$22 per unit B) $44 per unit C) $11.00 per unit D) $22 per unit

Answer: D

221) Suppose the monthly cost for manufacturing bar stools is C(x) = 529 + 23x, where x is the number of bar stools produced each month. Find and interpret the marginal cost for the product.
A) $529 per bar stool; Manufacturing one additional bar stool increases the cost by $529.
B) $529 per bar stool; Manufacturing one additional bar stool decreases the cost by $529.
C) $23 per bar stool; Manufacturing one additional bar stool decreases the cost by $23.
D) $23 per bar stool; Manufacturing one additional bar stool increases the cost by $23.

Answer: D

222) Suppose the monthly total revenue for manufacturing baseball bats is R(x) = 26.00x, where x is the number of bats sold each month. Find and interpret the marginal revenue for the product.
A) -$2.60 per bat; The revenue will decrease by $26.00 for each additional bat sold in a month.
B) $260 per bat; The revenue will increase by $260 for each additional bat sold in a month.
C) $2.60 per bat; The revenue will increase by $2.60 for each additional bat sold in a month.
D) $26.00 per bat; The revenue will increase by $26.00 for each additional bat sold in a month.

Answer: D

223) The profit for a product is given by the function P(x) = 35x - 1086, where x is the number of units produced and sold. Find the marginal profit for the product.
A) -$35 per unit B) $35 per unit C) $1086 per unit D) -$1086 per unit

Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

224) To find the x-intercept of a line we let _ = 0 and solve for _.

Answer: y, x

225) The equation _ = -7 has a horizontal line as its graph.

Answer: y

226) Give a definition or an example of the word or phrase: Perpendicular lines

Answer: Two lines which intersect at right angles. (Answers may vary.)

227) Why is the slope of a horizontal line equal to zero? Give an example.

Answer: Answers may vary. One possibility: The slope of a horizontal line is equal to zero because the y-values do not change as the x-values change. For example, the points (3, 4) and (7, 4) are two points on a horizontal line. The slope of this line is zero because $m = \frac{4 - 4}{7 - 3} = \frac{0}{4} = 0$.

228) Explain what is wrong with the statement "The line has no slope."

Answer: Answers may vary. One possibility: It is not specific enough. The slope of a horizontal line is 0, while the slope of a vertical line is undefined.

229) Why is the slope of a vertical line undefined?

Answer: Answers may vary. One possibility: Let (a, b) and (a, c), $b \neq c$, be any two different points on a vertical line. The slope of the line $= \frac{y_1 - y_2}{x_1 - x_2} = \frac{b - c}{a - a} = \frac{b - c}{0}$. Division by zero is undefined.

230) Explain why the order in which coordinates are subtracted to find slope does not matter as long as x-coordinates are subtracted in the same order as y-coordinates.

Answer: Answers may vary. One possibility: $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 \cdot (y_2 - y_1)}{-1 \cdot (x_2 - x_1)} = \frac{y_1 - y_2}{x_1 - x_2}$.

231) If one line has a slope of -3 and another line has a slope of -6, which line is steeper? Why?

Answer: The line with a slope of -6 is steeper, because the larger the absolute value of the slope, the steeper the line. (Explanations will vary.)

232) Is it possible for the x-intercept and the y-intercept of a straight line to be at the same point? Explain your answer.

Answer: Yes. If the line passes through the origin, then both the x-intercept and the y-intercept are at (0, 0).

233) Does every straight line have an x-intercept? If not, give an example of an equation whose graph does not have an x-intercept.

Answer: The x-intercept is the point where the line crosses the x-axis. Lines parallel to the x-axis do not intercept the x-axis. Thus the graph of any equation of the form y = b where $b \neq 0$ has no x-intercept.

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

Write the equation of the line using the information given about its graph.

234) Slope $-\frac{8}{5}$, y-intercept $\frac{36}{5}$

A) $y = -\frac{8}{5}x + \frac{36}{5}$ B) $y = \frac{8}{5}x + \frac{36}{5}$ C) $y = -\frac{8}{5}x - \frac{36}{5}$ D) $y = \frac{8}{5}x - \frac{36}{5}$

Answer: A

235) Slope $-\frac{2}{5}$, y-intercept 6

A) $y = -\frac{2}{5}x - 6$ B) $y = \frac{2}{5}x - 6$ C) $y = \frac{2}{5}x + 6$ D) $y = -\frac{2}{5}x + 6$

Answer: D

236) Slope $\frac{2}{5}$, y-intercept 3

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

Answer: C

237) Slope $\frac{1}{2}$, y-intercept 1

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

Answer: A

238) Slope $-\frac{2}{7}$, y-intercept $\frac{43}{7}$

A) $y = -\frac{2}{7}x - \frac{43}{7}$ B) $y = -\frac{2}{7}x + \frac{43}{7}$ C) $y = \frac{2}{7}x + \frac{43}{7}$ D) $y = \frac{2}{7}x - \frac{43}{7}$

Answer: B

239) Slope $-\frac{3}{4}$, y-intercept $\frac{11}{4}$

A) $y = -\frac{3}{4}x + \frac{11}{4}$ B) $y = \frac{3}{4}x + \frac{11}{4}$ C) $y = \frac{3}{4}x - \frac{11}{4}$ D) $y = -\frac{3}{4}x - \frac{11}{4}$

Answer: A

240) Slope $-\frac{2}{7}$, y-intercept 5

A) $y = -\frac{2}{7}x - 5$ B) $y = \frac{2}{7}x + 5$ C) $y = -\frac{2}{7}x + 5$ D) $y = \frac{2}{7}x - 5$

Answer: C

241) Slope $-\frac{2}{9}$, y-intercept 3

A) $y = \frac{2}{9}x - 3$ B) $y = -\frac{2}{9}x + 3$ C) $y = \frac{2}{9}x + 3$ D) $y = -\frac{2}{9}x - 3$

Answer: B

242) Rate of change -6, y = -8 when x = 0

A) y = -6x - 8 B) y = -6x + 6 C) y = -6x + 8 D) y = -8x - 6

Answer: A

243) Rate of change 9, $y = -\frac{4}{7}$ when x = 0

A) $y = -\frac{4}{7}x + 9$ B) $y = -\frac{4}{7}x - 9$ C) $y = 9x - \frac{4}{7}$ D) $y = 9x + \frac{4}{7}$

Answer: C

Write an equation of the line through the given point with the given slope. Write the equation in slope-intercept form.

244) (3, 3); m = - 3

A) y = -3x + 12 B) $y = -\frac{1}{3}x + 12$ C) $y = -3x + \frac{1}{12}$ D) y = -3x - 12

Answer: A

245) (4, 3); $m = -\frac{2}{3}$

A) $y = -\frac{2}{3}x + \frac{3}{17}$ B) $y = -\frac{2}{3}x + \frac{17}{3}$ C) $y = -\frac{3}{2}x + \frac{17}{3}$ D) $y = -\frac{2}{3}x - \frac{17}{3}$

Answer: B

246) (5, 3); $m = -\frac{3}{8}$

A) $y = -\frac{8}{3}x - \frac{8}{39}$ B) $y = -\frac{3}{8}x + \frac{8}{39}$ C) $y = -\frac{3}{8}x + \frac{39}{8}$ D) $y = -\frac{3}{8}x - \frac{39}{8}$

Answer: C

247) (-7, 10); m = 0

A) $y = \frac{7}{10}x + 0$ B) $y = \frac{10}{7}x + 0$ C) y = 10 D) x = -7

Answer: C

248) (-5, 0); m = -7

A) y = 7x - 5 B) y = -7x - 35 C) y = 5x - 7 D) y = -5x - 7

Answer: B

249) (4, -3); m = -9

A) y = 9x + 32 B) y = -9x + 31 C) y = -9x + 34 D) y = -9x + 33

Answer: D

250) (-4, 6); m = -4

A) y = -4x - 11 B) y = -4x - 18 C) y = 4x - 12 D) y = -4x - 10

Answer: D

251) (8, -2); m = $-\frac{4}{5}$

A) $y = \frac{4}{5}x - \frac{22}{5}$ B) $y = -\frac{4}{5}x + 6$ C) $y = -\frac{4}{5}x + \frac{42}{5}$ D) $y = -\frac{4}{5}x + \frac{22}{5}$

Answer: D

252) (-1, 7); horizontal

A) y = 7 B) x = -1 C) y = 1 D) x = -7

Answer: A

Write the slope-intercept form of the equation for the line passing through the given pair of points.

253) (9, 5) and (0, -3)

A) $y = \frac{8}{9}x - 3$ B) $y = \frac{4}{3}x - 3$ C) $y = -\frac{8}{9}x - 3$ D) $y = -\frac{4}{3}x - 3$

Answer: A

254) (-4, 0) and (5, -2)

A) $y = \frac{4}{7}x + \frac{6}{7}$ B) $y = -\frac{2}{9}x - \frac{8}{9}$ C) $y = \frac{2}{9}x - \frac{8}{9}$ D) $y = -\frac{4}{7}x + \frac{6}{7}$

Answer: B

255) (-7, 1) and (6, 3)

A) $y = \frac{2}{13}x + \frac{27}{13}$ B) $y = -\frac{8}{3}x + 19$ C) $y = -\frac{2}{13}x + \frac{27}{13}$ D) $y = \frac{8}{3}x + 19$

Answer: A

256) (-5, -3) and (-1, -6)

A) $y = \frac{2}{5}x - \frac{32}{5}$ B) $y = \frac{3}{4}x - \frac{27}{4}$ C) $y = -\frac{2}{5}x - \frac{32}{5}$ D) $y = -\frac{3}{4}x - \frac{27}{4}$

Answer: D

257) (-5, 2) and (-5, 8)

A) y = 2 B) x = -5 C) 2x + 8y = 0 D) 8x + 2y = 0

Answer: B

258) (8, -3) and (-8, -3)

A) x = 8 B) -8x + 8y = 0 C) y = -3 D) 8x - 8y = 0

Answer: C

259) (4, 2) and (10, 2)

A) 10x + 4y = 0 B) x = 4 C) 4x + 10y = 0 D) y = 2

Answer: D

260) y-intercept -10 and x-intercept -9

A) $y = \frac{9}{10}x - 9$ B) $y = -\frac{9}{10}x - 9$ C) $y = \frac{10}{9}x - 10$ D) $y = -\frac{10}{9}x - 10$

Answer: D

Write the equation of the line with the given conditions.

261) passing through (5, 2) and parallel to the line with equation $2x + y = 4$

A) $y = -2x + 12$ B) $y = -2x - 12$ C) $y = 2x - 12$ D) $y = -\frac{1}{2}x - 6$

Answer: A

262) passing through (-8, -3) and parallel to the line with equation $5x - 7y = 9$

A) $y = \frac{7}{5}x - \frac{3}{5}$ B) $y = -\frac{5}{7}x - \frac{19}{7}$ C) $y = -\frac{8}{7}x - \frac{9}{7}$ D) $y = \frac{5}{7}x + \frac{19}{7}$

Answer: D

263) passing through (2, 4) and perpendicular to the line with equation $-4x + y = 3$

A) $y = -4x - 18$ B) $y = \frac{1}{4}x - \frac{9}{2}$ C) $y = -\frac{1}{4}x + \frac{9}{2}$ D) $y = -\frac{1}{4}x - \frac{9}{2}$

Answer: C

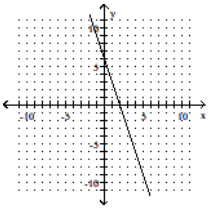
264) passing through (3, -7) and perpendicular to the line with equation $4x - 5y = -23$

A) $y = -\frac{5}{4}x - \frac{13}{4}$ B) $y = -\frac{4}{5}x - \frac{4}{5}$ C) $y = \frac{5}{4}x - \frac{13}{4}$ D) $y = -\frac{3}{5}x - \frac{23}{5}$

Answer: A

Write the equation of the line whose graph is shown.

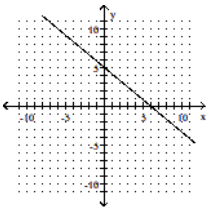
265)



A) $y = -2x + 6$ B) $y = -3x + 6$ C) $y = -\frac{1}{3}x + 2$ D) $y = 2x + 6$

Answer: B

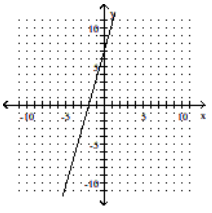
266)



A) $y = -\frac{5}{6}x + 5$ B) $y = 6x + 5$ C) $y = -\frac{6}{5}x + 6$ D) $y = -6x + 5$

Answer: A

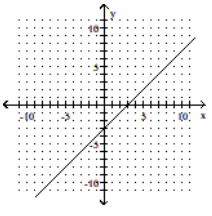
267)



A) $y = \frac{2}{7}x - 2$ B) $y = \frac{7}{2}x + 7$ C) $y = 2x + 7$ D) $y = -2x + 7$

Answer: B

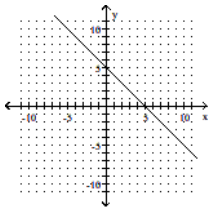
268)



A) $y = x + 3$ B) $y = -x + 3$ C) $y = x - 3$ D) $y = -x - 3$

Answer: C

269)



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

Answer: C

Find the average rate of change for the function over the given interval.

270) $y = x^2$ between x = -5 and x = 10

A) 15 B) -5 C) 1 D) 5

Answer: D

271) $y = 6x^3$ between x = -1 and x = 1

A) -6 B) 6 C) 12 D) 0

Answer: B

272) $y = 4x^2$ between x = 0 to $x = \frac{7}{4}$

A) $-\frac{3}{10}$ B) $\frac{1}{3}$ C) 2 D) 7

Answer: D

273) y = 5x + 7 between x = -1 and x = 0

A) $\frac{1}{2}$ B) $-\frac{1}{6}$ C) -28 D) 5

Answer: D

274) $y = x^2 + 8x$ between x = 7 and x = 9

A) $\frac{16}{3}$ B) 24 C) $\frac{153}{2}$ D) 17

Answer: B

275) $y = 3x^3 + 8x^2 + 2$ between x = -7 and x = 5

A) $\frac{577}{5}$ B) $\frac{577}{12}$ C) $\frac{1212}{5}$ D) 101

Answer: D

276) $y = -3x^2 - x$ between $x = 5$ and $x = 6$

A) $\frac{1}{2}$ B) -2 C) $-\frac{1}{6}$ D) -34

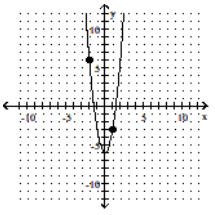
Answer: D

277) $y = x^3 + x^2 - 8x - 7$ between $x = 0$ and $x = 2$

A) $-\frac{1}{6}$ B) -2 C) -28 D) $\frac{1}{2}$

Answer: B

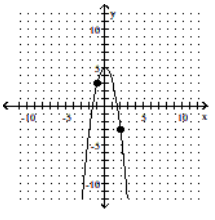
278) Find the average rate of change from $(-2, 6)$ to $(1, -3)$.



A) $\frac{1}{3}$ B) -3 C) 3 D) $-\frac{1}{3}$

Answer: B

279) Find the average rate of change from $(-1, 3)$ to $(2, -3)$.



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

Answer: D

Solve the problem.

280) It costs $29 per hour plus a flat fee of $17 for a plumber to make a house call. What is an equation of the form $y = mx + b$ for this situation?

A) $y = 17x + 29$ B) $y = 29x$ C) $y = 29x + 17$ D) $y = 17x$

Answer: C

281) Using a phone card to make a long distance call costs a flat fee of $0.88 plus $0.25 per minute starting with the first minute. What is an equation of the form y = mx + b for this situation?

A) y = 0.88x + 0.25 B) y = 0.25x C) y = 0.25x + 0.88 D) y = 0.88x

Answer: C

282) A moving firm charges a flat fee of $45 plus $40 per hour. Let y be the cost in dollars of using the moving firm for x hours. Find the slope-intercept form of the equation.

A) y = 40x - 45 B) y = 45x + 40 C) y = 40x + 45 D) y = 45x - 40

Answer: C

283) An electrician charges a fee of $45 plus $30 per hour. Let y be the cost in dollars of using the electrician for x hours. Find the slope-intercept form of the equation.

A) y = 45x + 30 B) y = 30x + 45 C) y = 45x - 30 D) y = 30x - 45

Answer: B

284) A cab company charges a base rate of $1.50 plus 15 cents per minute. Let y be the cost in dollars of using the cab for x minutes. Find the slope-intercept form of the equation.

A) y = 1.50x + 0.15 B) y = 0.15x + 1.50 C) y = 0.15x - 1.50 D) y = 1.50x - 0.15

Answer: B

285) A cable TV company charges $24 for the basic service plus $8 for each movie channel. Let y be the total cost in dollars of subscribing to cable TV, using x movie channels. Find the slope-intercept form of the equation.

A) y = 24x + 8 B) y = 24x - 8 C) y = 8x + 24 D) y = 8x - 24

Answer: C

286) Assume that the sales of a certain appliance dealer are approximated by a linear function. Suppose that sales were $7500 in 2007 and $56,500 in 2012. Let x = 0 represent 2007. Find the equation giving yearly sales y.

A) S(x) = 9800x + 56,500 B) S(x) = 9800x + 7500

C) S(x) = 49,000x + 56,500 D) S(x) = 49,000x + 7500

Answer: B

287) A gas station sells 4820 gallons of regular unleaded gasoline on a day when they charge $1.35 per gallon, whereas they sell 3861 gallons on a day that they charge $1.40 per gallon. Find a linear function that expresses gallons sold as a function of price.

A) G(p) = -19,180p + 30,729 B) G(p) = -19,180p + 30,696.8

C) G(p) = -19,180p + 30,713 D) G(p) = -19,180p + 30,691.2

Answer: C

288) Persons taking a 30-hour review course to prepare for a standardized exam average a score of 620 on that exam. Persons taking a 70-hour review course average a score of 770. Find a linear function S(t), which fits this data, and which expresses score as a function of time.

A) S(t) = -3.75t + 507.5 B) S(t) = 3.75t + 507.5

C) S(t) = 3.375t - 511.5 D) S(t) = 3.375t + 511.5

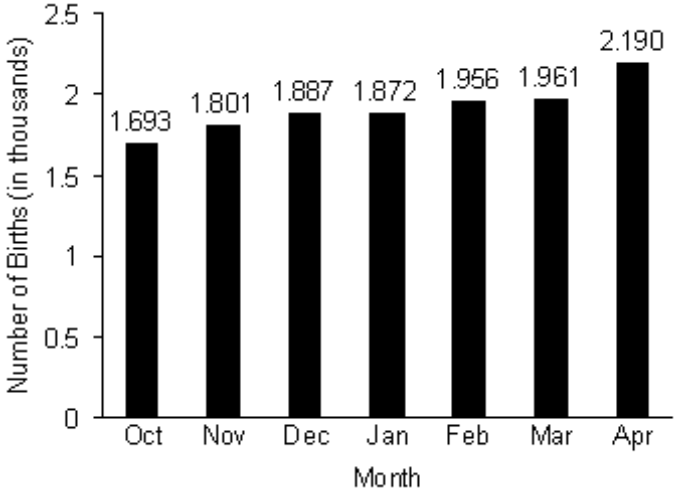
Answer: B

289) In 2012, a certain country recovered 26% of its municipal solid wastes through recycling, up from 17% in 2007. Let P represent the percentage recycled and t the number of years since 2007. Find a linear equation for P as a function of t.

A) P = 1.8t + 17 B) P = 0.9t - 17 C) P = -1.8t + 7 D) P = 1.8t + 24

Answer: A

290) The number of births in a certain state has been increasing in recent months. Using the information given on the bar graph for the months October to April, find an equation to model the number of births y for the month x. Let x = 0 correspond to October and x = 6 correspond to April. Use these two points to find the equation.



A) $y = \frac{497}{6}x + 1693$ B) $y = 71x + 1693$ C) $y = -71x + 1693$ D) $y = \frac{1}{17}x + 1693$

Answer: B

291) The following data show the list price, x, in thousands of dollars, and the dealer invoice price, y, also in thousand dollars, for a variety of sport utility vehicles. Find a linear equation that approximates the data, using the points (16.1) and (20.0, 18.3).

List Price	Dealer Invoice Price
16.5	16.1
17.6	17.0
20.7	18.2
23.1	19.3
20.0	18.3
24.6	21.0

A) y = 1.59x - 9.11 B) y = 0.629x + 6.38 C) y = 1.59x - 10.2 D) y = 0.629x + 5.73

Answer: D

292) The grade point average, G, of students at a community college is shown by age, x, in the table below. Use the lir connecting the points (18, 2.5) and (26, 3.2) to find a linear model for this data.

Age (years)	18	23	20	26	29	16	25	20	32
Grade Point Average	2.5	3.0	2.7	3.2	3.9	2.0	3.5	3.1	3.6

A) G = 0.0875x - 0.925 B) G = 0.0875x + 2.5875
C) G = 0.0875x + 0.925 D) G = 0.1x + 0.7

Answer: C

293) The forearm length in centimeters, A, can be approximated by a linear function of the foot length in centimeters, the points (25, 24) and (33, 33) to find a linear model for the data in the table below.

Foot Length (cm)	29	31	33	26	28	37	25	30	32
Forearm Length (cm)	30	30	33	25	28	37	24	31	31

A) A = f - 1 B) A = 1.125f + 4.125 C) A = 1.125f - 4.125 D) A = 0.889f + 1.775

Answer: C

294) The rate of return of certain investments increases as the risk factor of the investment increases. An investment with a risk factor of 2 has a rate of return of 5.0%. An investment with a risk factor of 24 has a rate of return of 12.0%. What is the average rate of return per unit of risk?

A) 3.14% per unit risk B) 1.90% per unit risk C) 0.53% per unit risk D) 0.32% per unit risk

Answer: D

295) A deep sea diving bell is being lowered at a constant rate. After 12 minutes, the bell is at a depth of 400 ft. After 45 minutes the bell is at a depth of 1700 ft. What is the average rate of lowering per minute?

A) 37.8 ft per minute B) 0.03 ft per minute C) 28.9 ft per minute D) 39.4 ft per minute

Answer: D

296) The table below shows the weight for a calf raised by a local rancher. Use the information to determine the average rate of change in the calf's weight per day.

Calf's Weight

Day	Weight (in lbs)
1	505
5	525
15	575
25	625
40	700

A) $\frac{1}{5}$ lb per day B) 50 lbs per day C) 500 lbs per day D) 5 lbs per day

Answer: D

297) A gas station sells 4820 gallons of regular unleaded gasoline in a day when they charge $1.35 per gallon, whereas they sell 3895 gallons on a day that they charge $1.40 per gallon. Find a linear function that expresses gallons sold as a function of price. Use this function to predict the number of gallons sold at a price of $1.28 per gallon.

A) 6124 gallons B) 6115 gallons C) 6111.7 gallons D) 6119.1 gallons

Answer: B

298) Persons taking a 30-hour review course to prepare for a standardized exam average a score of 620 on that exam. Persons taking a 70-hour review course average a score of 785. Find a linear function, S(t), which fits this data, and which expresses score as a function of time. Use this function to predict an average score for persons taking a 56-hour review course. Round your answer to the tenths place.

A) 727.3 B) 720.0 C) 731.5 D) 741.3

Answer: A

299) It costs $34 per hour plus a flat fee of $17 for a plumber to make a house call. Find the total cost to have a plumber come to a house for 6 hours.

A) $136 B) $221 C) $204 D) $584

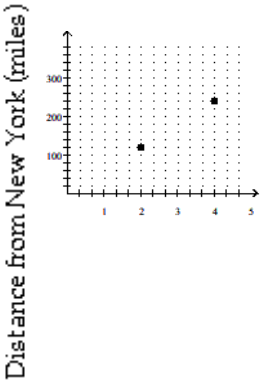
Answer: B

300) Using a phone card to make a long distance call costs a flat fee of $0.81 plus $0.16 per minute starting with the first minute. Find the total cost of a phone call which lasts 27 minutes.

A) $27.13 B) $4.32 C) $22.03 D) $5.13

Answer: D

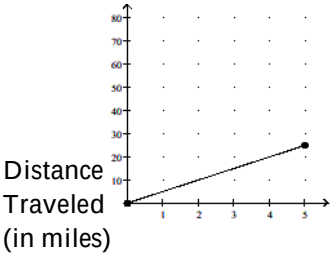
301) The following graph shows data for a recent train ride from New York to Toronto. At what rate did the train travel?



A) 60 miles per hour B) 50 miles per hour C) 120 miles per hour D) 65 miles per hour

Answer: A

302) Find the average rate of change illustrated in the graph.



A) 2.5 miles per hour B) 0.2 miles per hour C) 25 miles per hour D) 5 miles per hour

Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

303) Explain the process used to find the equation of a line through two different points.

Answer: Find the slope using the definition of slope, $m = \frac{y_2 - y_1}{x_2 - x_1}$. Use the slope and either of the two points in the point-slope form of the equation.

304) Give a definition of the slope-intercept form of an equation for a line.

Answer: The slope-intercept form for a line with slope m and y-intercept (0, b) is $y = mx + b$.

305) Describe a situation in which the point-slope form would be more useful than the slope-intercept form.

Answer: Point-slope form is more useful when one wants to find an equation of a line with a specified slope passing through a specified point that is not the y-intercept.

306) The total number of reported cases of AIDS in the United States has risen from 372 in 2001 to 100,000 in 2009 and 200,000 in 2012. Does a linear equation fit this data? Explain.

Answer: No, the data cannot be modeled by a linear equation because the reported cases are not increasing at a constant rate. Assume a linear equation, and examine the slope of the two line segments. The slope of the segment from (0, 372) to (8, 100,000) is 12,453.5 while the slope of the segment from (8, 100,000) to (11, 200,000) is $33{,}333.\overline{3}$.(Explanations will vary.)

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

307) A line passes through the points (8, 5) and (8, 2). The equation of this line is _____. The slope of the line is _____.

A) $x = 8$; undefined B) $y = 8$; 0 C) $y = 8$; undefined D) $x = 8$; 0

Answer: A

308) A line passes through the points (3, 8) and (7, 8). The equation of this line is _____. The slope of the line is _____.

A) $y = 8$; 0 B) $x = 8$; undefined C) $x = 8$; 0 D) $y = 8$; undefined

Answer: A

309) Determine if there is a linear relationship between the variables in the table.

Height (inches)	57	60	72	59	63	65	66	68	61
Time (seconds)	32.9	40.1	35.7	41.8	47.4	37.3	39.1	41.5	32.8

A) Yes B) No

Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

310) For the function given, show how you would find the average rate of change using the difference quotient.

$f(x) = 16 + 2x$

Answer: The difference quotient is given by $\frac{f(x + h) - f(x)}{h}$. So, using $16 + 2x$ for $f(x)$, we have $\frac{16 + 2(x + h) - (16 + 2x)}{h}$, which simplifies to $\frac{16 + 2x + 2h - 16 - 2x}{h}$, which simplifies to 2.