

1. The solution to the system of equations is an ordered pair (a, b) .
What is $a + b$?

$$y = 2x + 1$$
$$3x - y = 4$$

- a) 13
b) 16
c) 10
d) 4
2. The equations $y = -0.38x + 56.6$ and $y = .38x + 43.4$ represent the percent of men and women, respectively, receiving bachelor's degrees, where x is the number of years since 1968. In approximately what year were the two percents equal?

- a) 1990
b) 1995
c) 1980
d) 1985

3. The solution to this system of equations is an ordered triple (a, b, c) . What is $(a + b + c)$?

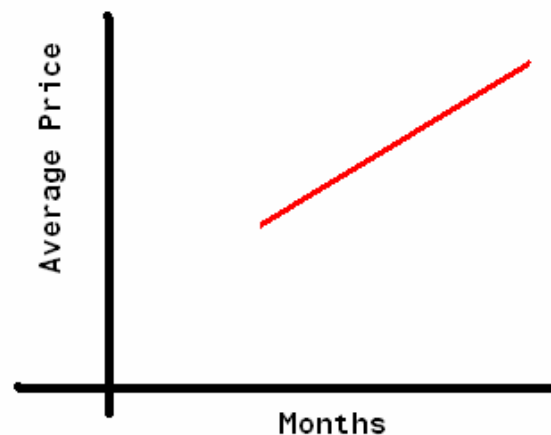
$$2x + y = 0$$
$$x + 3y - z = -11$$
$$7x + 5y + 4z = 21$$

- a) 11
b) -15
c) -13
d) 5
4. Given $f(x) = x^2 + 2x$, $f(x + h) =$

- a) $x^2 + h^2 + 2x + 2h$
b) $x^3 + x^2 h + 2x^2 + 2xh$
c) $x^2 + 2xh + h^2 + 2x + 2h$
d) $x^2 + 2xh + h^2 + 2x$

5. A company sells one of its products in boxes that are twice as long as they are wide and two inches higher than they are long. Find the height of such a box if the volume is 320 cubic inches.
- a) 4 in.
 - b) 8 in.
 - c) 10 in.
 - d) 14 in.
6. Let the function, $f(x) = \frac{\sqrt{5x}}{2}$ represent profit on an investment, where x represents the amount of money originally invested. How much money must be invested in order to earn \$50?
- a) \$7.91
 - b) \$2000
 - c) \$2050
 - d) \$20

7. The graph models the average price of gasoline over several months. Which statement is true about the price of gasoline over these months?

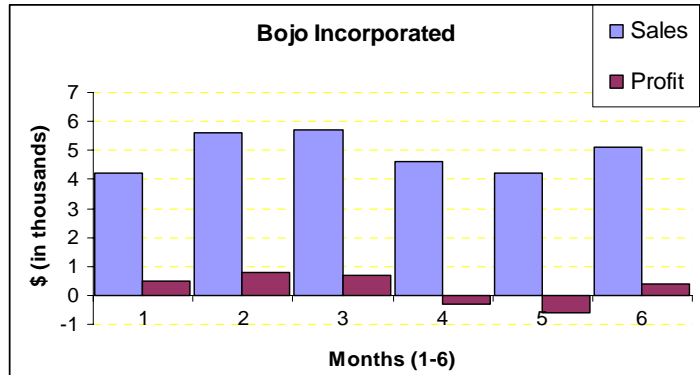


- i. The rate of change in the average price of gasoline was constant during this time frame.
 - ii. The price of gasoline was increasing during these months.
- a) only i is true
 - b) only ii is true
 - c) both i and ii are true
 - d) neither i nor ii are true

8. Given $f(x) = x^3 - 2x + 1$ and $g(x) = -x^2 + 5x + 12$, what is $(f + g)(x)$?
- a) $2x^3 + 3x + 13$
 - b) $3x + 13$
 - c) $x^3 - x^2 + 3x + 13$
 - d) $x^3 + x^2 - 7x - 11$
9. If a basketball league has x teams and each team plays each other two times, the total number of league games, g , is given by this function: $g = x^2 - x$. The Carolina Pines Basketball League plays a total of 72 games, with each team playing the other twice. How many teams are in the league?
- a) 7
 - b) 8
 - c) 9
 - d) 10
10. At a particular job, the function $f(x) = \frac{2x-19}{40-x}$, represents the amount of hours worked, x , in relation to the amount of stress, $f(x)$, felt by the workers. For what values of x does this graph have meaning?
- a) for $x \geq 9.5$
 - b) for all values of x
 - c) for $x \geq 9.5$ and $x < 40$
 - d) for $x \leq 9.5$ and $x > 40$
11. The equation: $x^2 + 3x - 10 = 0$, has two solutions a and b . What is $(a + b)$?
- a) 3
 - b) -3
 - c) 2
 - d) 7

12. Consider the graph shown here. Bojo only receives income from sales. Which statement is true?

- i. The sales for these six months were increasing.
 - ii. The expenses were more than the sales during the 5th month.
- a) only i is true
 - b) only ii is true
 - c) both i and ii are true
 - d) neither i nor ii are true

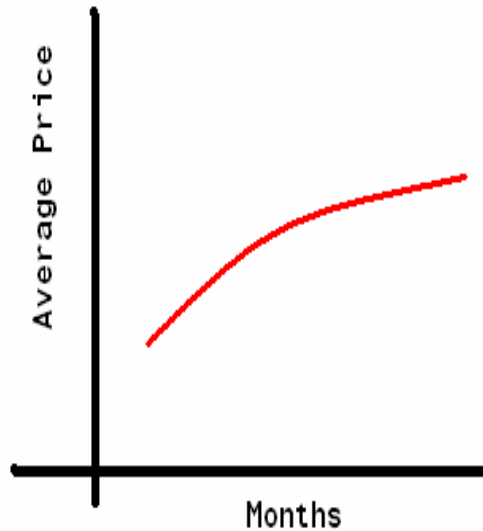


13. Which expression, in lowest terms, is equivalent to

$$\frac{3x}{x-5} - \frac{2x-25}{5-x} \quad ?$$

- a) 5
- b) -5
- c) $\frac{5}{x-5}$
- d) $-\frac{5}{x-5}$

14. The graph models the average price of diesel fuel over several months. Which statement is true?
- i. The average price of diesel fuel during these months decreased.
 - ii. The rate of change in the average price of diesel fuel was decreasing during these months.
- a) only i is true
 - b) only ii is true
 - c) both i and ii are true
 - d) neither i nor ii are true

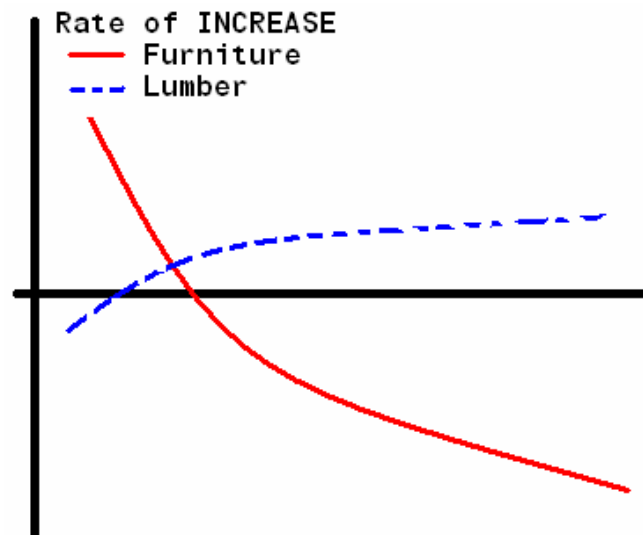


15. In a certain variation problem, r varies jointly with p and q . If p increases and q decreases, what will happen to r ?
- a) it stays the same
 - b) cannot be determined from the information
 - c) increases
 - d) decreases
16. A box of markers contains 8 black, 9 red, and 13 blue. What is the probability of picking a blue one first, a black one next, then another blue, if there is no replacement?
- a) $\frac{169}{3045}$
 - b) $\frac{52}{1015}$
 - c) $\frac{39}{870}$
 - d) $\frac{13}{290}$

17. Parallelogram WXYZ has vertices $W(2, -2)$, $X(6, -2)$, $Y(3, -5)$, and $Z(-1, -5)$. Find the new coordinates of the W vertex if the parallelogram is translated 4 units to the left and 7 units up.

- a) $(6, 5)$
- b) $(6, -9)$
- c) $(-2, 5)$
- d) $(-2, -9)$

18. The graph shows the RATE OF INCREASE over several months for furniture prices and lumber prices. How many times, during these months, was the price of furniture and the price of lumber the same?



- a) never
 - b) once
 - c) twice
 - d) it cannot be determined from this graph
19. Which statement is most often true about the line of best fit drawn on a scatter plot?
The line of best fit...
- a) is a line drawn through every point.
 - b) approximates the linear relationship of the data points.
 - c) always has a positive slope.
 - d) must be drawn through the first and last point of the data.

20. Josh needs to choose a 4-digit pin number to register for classes, he can use any of the ten digits only once. How many different pin numbers can he choose from?

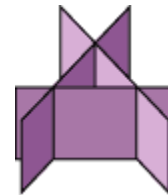
- a) 5040
- b) 8020
- c) 910
- c) 2040

21. $(\sqrt{3} + \sqrt{21})(\sqrt{3} - \sqrt{7}) =$

- a) $28 + 16\sqrt{3}$
- b) $3\sqrt{3}(3 - \sqrt{7})$
- c) $3 - \sqrt{21} + 3\sqrt{7} - \sqrt{3}$
- d) $3 - \sqrt{21} + 3\sqrt{7} - 7\sqrt{3}$

22. A graph of a system of three linear equations in three variables is shown here. How many solutions does the system have?

- a) 0
- b) 1
- c) 2
- d) 3



23. $3(x - 2) - 2(x - 3) =$

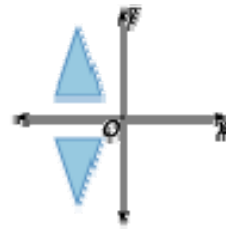
- a) $x^2 - x - 6$
- b) 6
- c) $x - 12$
- d) x
- e) 0

24. Dolores has 31 days to complete a quilt for Shirley's birthday. The red squares can be sewn at a rate of 4 squares per day, and the black ones at a rate of 7 per day. The quilt can have no more than 96 squares. The red fabric cost \$.80 per square, and the black fabric cost \$1.20 per square. If r is the number of red squares and b is the number of black squares, which function best describes her cost?

- a) $96 = 0.80r + 1.20b$
- b) $f(r, b) = 4r + 7b$
- c) $f(r, b) = .80r + 1.20b$
- d) $f(r + b) = .80r + 1.20b$

25. Name the line of symmetry for the pair of figures.

- a) x-axis
- b) y-axis
- c) 0
- d) none of the above



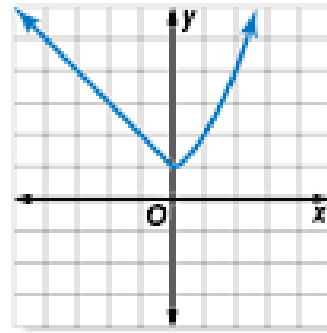
26. From 1992 to 1998 the average price P of an imported new car can be modeled by:

$$P = 214.3t^2 + 18132, \quad 2 \leq t \leq 8 \text{ where } t = 2 \text{ represents } 1992.$$

If the cost continued to increase according to this model, in what year would the average cost exceed \$56,000?

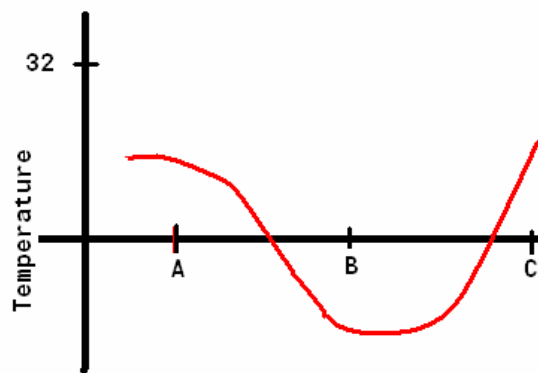
- a) 2003
 - b) 2004
 - c) 2005
 - d) 2006
27. Which of the following is the solution set of the inequality:
 $|x + 3| \geq 7$?
- a) $x \geq 4$
 - b) $x \leq -4 \cup x \geq 4$
 - c) $x \leq -10 \cup x \geq 4$
 - d) $x \geq -4 \cup x \leq 10$

28. What type of function is shown in the graph?



- a) piecewise function
- b) step function
- c) absolute value function
- d) constant function

29. The graph shows the outside temperature at a location in a northern state. At how many of the times, A, B, or C, was the temperature above zero?



- a) at none of the times
- b) at one of the times
- c) at two of the times
- d) at three of the times

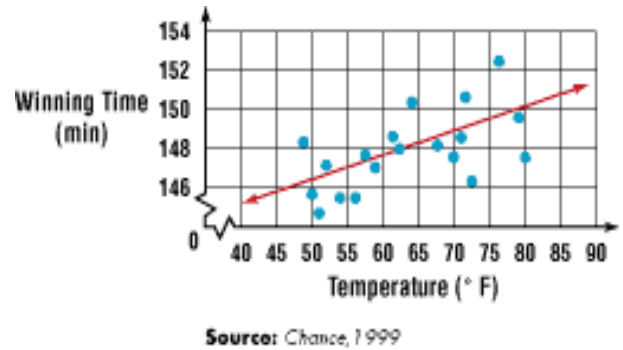
30. What is the sum of the arithmetic series where $n = 45$, $a_1 = 14.3$, and $a_n = 80.3$.

- a) 3627.8
- b) 4257
- c) 2128.5
- d) 3613.5

31. Which of the following integers is the 10th term of the geometric sequence whose 1st term is 3, and ratio is -2

- a) -54
- b) -45
- c) 1356
- d) -1536

32. The scatter plot shows the women's winning marathon times and the high temperatures on the marathon days. Which equation best represents how marathon times and temperature are related?



- a) $y = \frac{1}{8}x - 140$
- b) $y = -\frac{1}{8}x + 140$
- c) $y = \frac{1}{8}x$
- d) $y = \frac{1}{8}x + 140$

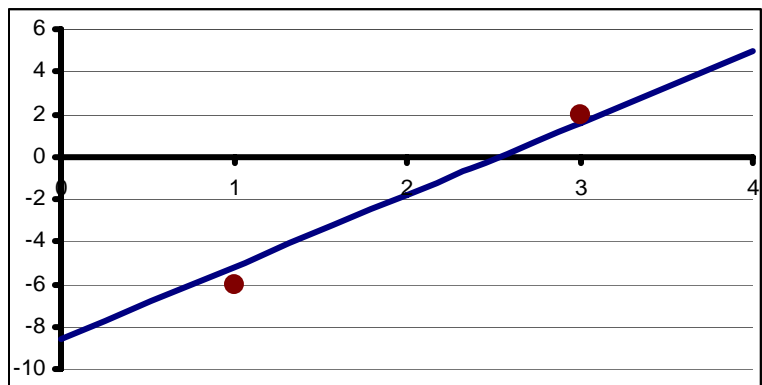
33. There are two solutions to the following inequality:

$$|4 - x| = |3 - 2(5 - x)|$$

What is the sum of the two solutions?

- a) $\frac{20}{3}$
- b) 3.2
- c) -2
- d) $\frac{14}{3}$

34. Consider the graph shown here. Between what two integers is slope of the line most likely found?



- a) between 4 and 9
- b) between 3 and 4
- c) between 2 and 3
- d) between 1 and 2

35. Vincent starts jogging from point A to point B. A half an hour later, Chris starts jogging following Vincent's path. Chris jogs 1 mile slower than twice Vincent's rate. If Chris passes Vincent in 2 hours, how many miles would Chris had jogged in those 2 hours?
- a) 6 miles
 - b) $6\frac{2}{5}$ miles
 - c) $3\frac{2}{5}$ miles
 - d) $3\frac{1}{3}$ miles
36. A 55-gallon barrel contains a mixture that is 40% gasoline. How much of this mixture must be withdrawn and replaced with exactly the same amount of pure gasoline to bring the mixture up to 75% concentration with the same volume?
- a) about 26.4 gallons
 - b) about 32.1 gallons
 - c) about 38.3 gallons
 - d) about 40.1 gallons
37. Which equation contains the point (-8 ,1) ?
- a) $y = \frac{3}{4}x + 7$
 - b) $y = \frac{1}{5}x + 1$
 - c) $y = -\frac{3}{4}x - 5$
 - d) $y = -\frac{3}{4}x + 7$

38. For which of the following operations is the commutative property not valid?
- a) Multiplication of real numbers
 - b) Multiplication of complex numbers
 - c) Multiplication of negative real numbers
 - d) Multiplication of matrices
39. What would this formula be in terms of P ? $A = P + Prt$.
- a) $P = A - Prt$
 - b) $P = \frac{A}{Prt}$
 - c) $P = \frac{A + rt}{1 + P}$
 - d) $P = \frac{A}{1 + rt}$
40. The price of a television has been discounted 15%. You paid \$899.45 for it. What is the original price of the television?
- a) \$1121.43
 - b) \$1058.18
 - c) \$1034.37
 - d) \$764.53
41. Mr. Bowden purchased a water front home that has a perimeter of 1000 feet. For privacy, he is going to fence three sides. Fencing across the length will cost him \$25 per foot. The two sides will only cost him \$5 per foot. If the total cost of the fence is \$9500. What are the length and the width of the lot in feet?
- a) 200 x 300
 - b) 300 x 200
 - c) 150 x 350
 - d) 350 x 150

Short Answer

66. What is the x-coordinates of the endpoint $A(x_2, y_2)$ of a segment whose other endpoint is $B(3, 2)$ and whose midpoint is $M(5, 4)$?
67. Evaluate the following expression if $x = -3$ and $y = 1/6$.

$$(x - y)^2 - y(x + y) - x(x + y)$$

68. Two planes leave the same airport at the same time flying in different directions, one is flying due north and the other is due west. The northbound plane is flying 100 mph faster than the west bound plane. After 2 hours the planes are 1500 miles apart. What is the speed of the northbound plane (to the nearest mile per hour)?
69. How many vertices does a cube have?
70. Consider the spreadsheet below. What should be the output for cell D3?

	A	B	C	D
1	1	=A1 + A2	=A1 + B1	=C1 - B1
2	2	=A2 + A3	=A2 + B2	=C2 - B2
3	4	=A3 + A4	=A3 + B3	=C3 - B3
4	5			