

Directions: Choose the best answer. *N.O.T.* means "none of these"

(1) The vertices of $\triangle ABC$ are $(-15, 0)$, $(1, 12)$, and $(10, 0)$. Find the perimeter.

- (a) 50 (b) 60 (c) 100 (d) 132 (e) N.O.T.

(2) The vertices of $\triangle ABC$ are $(-15, 0)$, $(1, 12)$, and $(10, 0)$. Find the area.

- (a) 50 (b) 60 (c) 100 (d) 132 (e) N.O.T.

(3) An expression equivalent to $\frac{a}{b} - \frac{1}{a} = \frac{c}{b}$ is:

- (a) $ac - bc = ac$ (b) $a^2 + b^2 = ac$ (c) $a = c - 1$ (d) $b = a^2 - ac$ (e) N.O.T.

(4) Simplify the expression $8 + \frac{1}{\sqrt{3}-2} - \frac{1}{\sqrt{3}+2}$

- (a) 4 (b) 8 (c) 1 (d) -2 (e) N.O.T.

For problems 5, 6, and 7, use the following information: The average cost of health insurance per year, t years after 2008, for a family is given by: $y = 700t + 12700$.

(5) What does the slope 700 represent in this situation?

- (a) The average cost of health insurance in 2008.
(b) The average cost of health insurance after 1 year.
(c) The price increase, per year, for health insurance after 2008.
(d) The average cost of insurance today.
(e) N.O.T.

(6) What does the y-intercept 12700 represent in this situation?

- (a) The average cost of health insurance in 2008.
(b) The average cost of health insurance after 1 year.
(c) The price increase, per year, for health insurance after 2008.
(d) The average cost of insurance today.
(e) N.O.T.

(7) In what year will the cost reach \$18,300 per year for a family?

(a) 2020

(b) 2016

(c) 2050

(d) 2010

(e) N.O.T.

(8) Which of the following collections of numbers has a median of 6?

(a) 1, 6, 6, 5, 9

(b) 7, 6, 5, 4

(c) 2, 4, 6, 8

(d) 1, 2, 10, 11, 11

(e) N.O.T.

(9) A line intersects the x and y-axes as shown below. Which of these is a possible equation of the line?

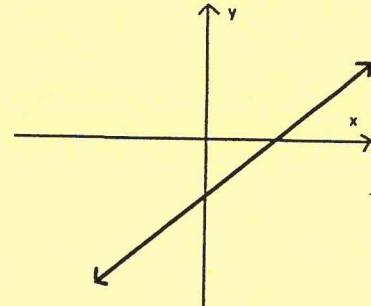
(a) $y = 2x + 4$

(b) $y = -5x$

(c) $y = 3x - 1$

(d) $y = -4x - 3$

(e) N.O.T.



(10) Solve: $5^x = \frac{1}{\sqrt{5}}$.

(a) $x = -\frac{1}{2}$

(b) $x = -1$

(c) $x = \frac{1}{5}$

(d) $x = \frac{1}{2}$

(e) N.O.T.

(11) If a function V models the value of a certain work of art t days after it was auctioned, which of the following could be an appropriate domain for V ?

(a) All real numbers

(b) All negative real numbers

(c) Any integer

(d) Any positive integer

(e) N.O.T.

(12) Solve: $\frac{k}{p} = m + k$ for p .

(a) $\frac{m+k}{k}$

(b) $\frac{k}{m+k}$

(c) $\frac{1}{m}$

(d) $m + 1$

(e) N.O.T.

(13) Solve the system of equations: $\begin{cases} 3x + 4y = 4 \\ 2x - 3y = 14. \end{cases}$

(a) (4, 2)

(b) (-4, -2)

(c) (4, -2)

(d) (-4, 2)

(e) N.O.T.

(14) Consider the graph of a function $y = f(x)$. How is the graph of $y = 3 \cdot f(x)$ constructed from the graph of f ?

(a) Vertical stretch by a factor of 3

(b) Vertical shrink by a factor of 3

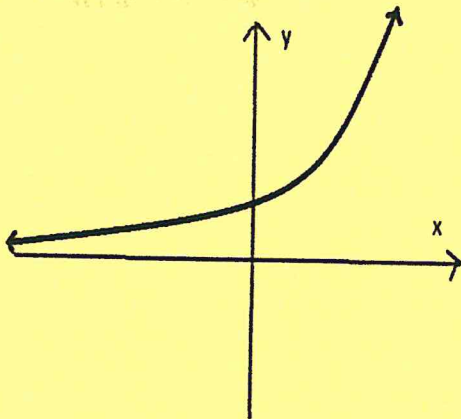
(c) Horizontal stretch by a factor of 3

(d) Horizontal shrink by a factor of 3

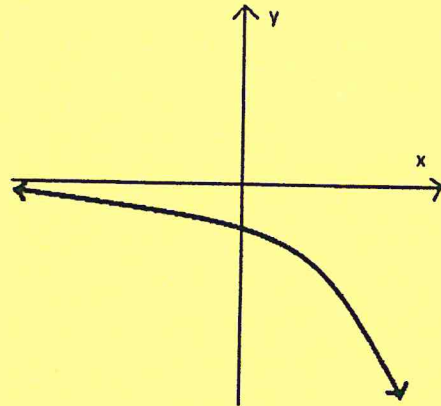
(e) N.O.T.

(15) Which of these figures could represent the graph of $y = 5^{-x}$?

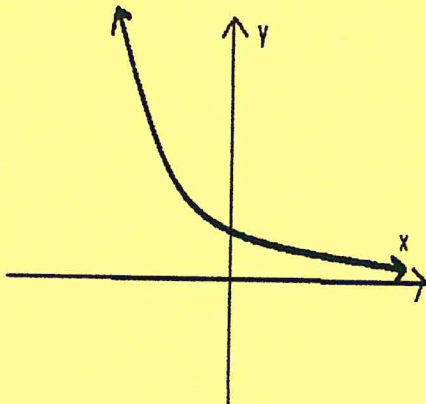
(a)



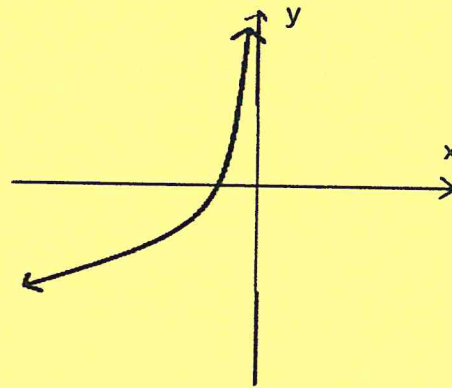
(b)



(c)



(d)



(e) N.O.T.

(16) A triangle on the coordinate plane is rotated 90° , translated 3 units horizontally, then reflected about the y -axis. Which of the following must be true about the triangle obtained after this sequence of transformations?

- (a) The new triangle must have a side length of 3.
- (b) The new triangle must be a right triangle.
- (c) The new triangle is similar, but not congruent to the original triangle.
- (d) The new triangle is congruent to the original triangle.
- (e) N.O.T.

(17) Which of the following functions represents the sequence: 0, 3, 8, 15, 24, 35, ...

- (a) $f(n) = 3n, n \geq 0$
- (b) $f(n) = 3n - 1, n \geq 1$
- (c) $f(n) = n^2 - 1, n \geq 1$
- (d) $f(n) = 3 - n^3, n \geq 0$
- (e) N.O.T.

(18) Solve the following inequality: $|2x + 3| < 9$.

(a) $-6 \leq x \leq 3$

(b) $-6 < x < 3$

(c) $x < 3$

(d) $x > -6$

(e) N.O.T.

(19) A table of values of the function $y = f(x)$ is given below. If the function is linear, what is the value of $f(2)$?

(a) 0

(b) $-\frac{7}{3}$

(c) -2

(d) -1

(e) N.O.T.

| | | | | |
|--------|----|----|----|-----------------|
| x | -7 | -4 | 5 | 10 |
| $f(x)$ | 5 | 3 | -3 | $-\frac{19}{3}$ |

(20) Tom has grades of 90, 84, and 77 on three math test. What grade must he obtain on the next test to have an average of exactly 85 for the four tests?

(a) 92

(b) 89

(c) 100

(d) 77

(e) N.O.T.

(21) If the line passing through the points $(a, 3a)$ and $(2, 7)$ has a slope of -1 , the value of a is

(a) $\frac{9}{4}$

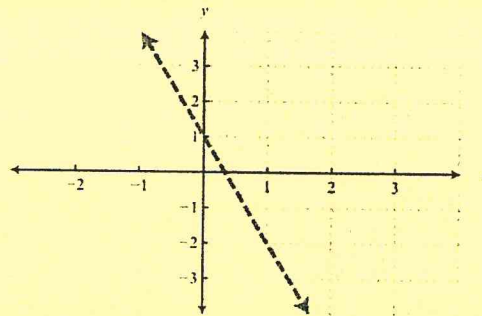
(b) 0

(c) 6

(d) $-\frac{9}{4}$

(e) N.O.T.

(22) Which inequality is shown in the graph below?



(a) $x - y > 3$

(b) $y \leq -2x + 5$

(c) $y > -3x + 1$

(d) $y > -3x$

(e) N.O.T.

(23) If two lines are graphed and we determine that they are perpendicular, then which of the following must be true?

(a) The equations of the lines will have a common solution of $(-1, -1)$.

(b) The lines will have slopes which are negative reciprocals.

(c) The lines will have slopes which are negative.

(d) The equations of the lines will have an infinite number of common solutions.

(e) N.O.T.

(24) Solve the following equation: $|x - 3| = |3 - x|$.

- (a) 3 (b) 7 (c) No solution (d) All real numbers (e) N.O.T.

(25) The distance between the points (5, -1) and (-4, 6) is

- (a) $\sqrt{26}$ (b) $\sqrt{10}$ (c) $\sqrt{32}$ (d) $\sqrt{130}$ (e) N.O.T.

(26) The absolute value of a complex number $a + bi$ is its distance from the origin. Using the distance formula we have $|a + bi| = \sqrt{a^2 + b^2}$. Find the absolute value of $|-3 + i|$.

- (a) -3 (b) 10 (c) -10 (d) $\sqrt{10}$ (e) N.O.T.

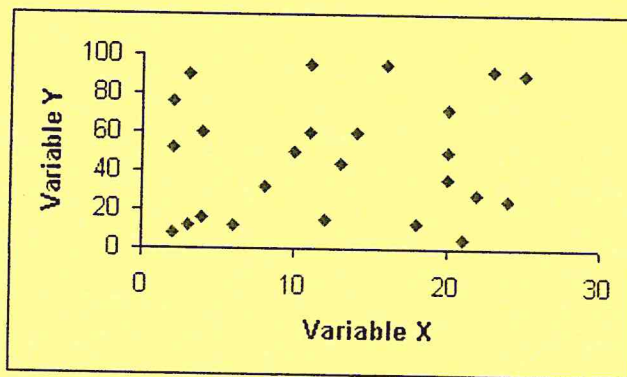
(27) Find the mode of the following data: 23, 24, 27, 18, 19, 27

- (a) 23 (b) 19 (c) 23.5 (d) 27 (e) N.O.T.

(28) Find $f(0)$ if $f(x) = \begin{cases} x, & \text{if } x < 0 \\ 2x + 1, & \text{if } x \geq 0 \end{cases}$

- (a) 0 (b) -1 (c) 1 (d) 3 (e) N.O.T.

(29) Which statement is true about the data shown in the scatter plot below?



- (a) There is no correlation between the two sets of data.
(b) There is a positive correlation between the two sets of data.
(c) There is a negative correlation between the two sets of data.
(d) The correlation between the data is both positive and negative.
(e) N.O.T.

(30) The number of floors of each building in a particular city is recorded in the table below. Select the correct stem-and-leaf plot of the data.

| Number of Floors | | | | | | | | | | | | | | | | | | | |
|------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 24 | 38 | 46 | 16 | 28 | 31 | 12 | 27 | 32 | 49 | 33 | 12 | 38 | 34 | 48 | 22 | 36 | 29 | 47 | 41 |
| 49 | 30 | 21 | 17 | 40 | 13 | 32 | 15 | 31 | 21 | 13 | 16 | 43 | 33 | 30 | 25 | 28 | 29 | 13 | 11 |

(a) Number of Floors

Key: "1 | 1" means 11

| Stems | Leaves |
|-------|---------------|
| 1 | 1 2 3 5 6 7 |
| 2 | 1 2 4 5 7 8 9 |
| 3 | 0 1 2 3 4 6 8 |
| 4 | 0 1 3 6 7 8 9 |

(b) Number of Floors

Key: "1 | 1" means 11

| Stems | Leaves |
|-------|----------------------------------|
| 1 | 11 12 12 13 13 13 15 16 16 17 |
| 2 | 21 21 22 24 25 27 28 28 29 29 |
| 3 | 30 30 31 31 32 32 33 33 34 36 38 |
| 4 | 40 41 43 46 47 48 49 49 |

(c) Number of Floors

Key: "1 | 1" means 11

| Stems | Leaves |
|-------|-------------------------|
| 1 | 1 2 2 3 3 3 5 6 6 7 |
| 2 | 1 1 2 4 5 7 8 8 9 9 |
| 3 | 0 0 1 1 2 2 3 3 4 6 8 8 |
| 4 | 0 1 3 6 7 8 9 9 |

(d) Number of Floors

Key: "1 | 1" means 11

| Stems | Leaves |
|-------|----------------------|
| 1 | 11 12 13 15 16 17 |
| 2 | 21 22 24 25 27 28 29 |
| 3 | 30 31 32 33 34 36 38 |
| 4 | 30 31 33 36 37 38 39 |

(e) N.O.T.