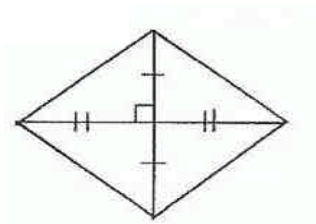
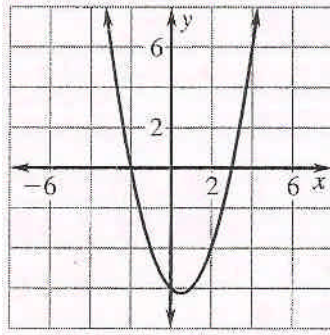


1. At the beginning of an experiment there are 100 bacteria in a colony. If the experiment begins at 1:00 a.m. and the number of bacteria doubles every three hours, at what time will the colony number 3,200?
- a. 6:00 p.m. b. 9:00 a.m. c. 12:00 noon d. 4:00 p.m. e. NG
2. Which of the following ordered pairs (x,y) is a solution to the equation $2x - 3y = 6$
- a. $(6,3)$ b. $(3,0)$ c. $(3,2)$ d. $(2,3)$ e. NG
3. What is the 30th digit in the decimal representation of $\frac{4}{7}$?
- a. 1 b. 5 c. 7 d. 8 e. NG
4. The diagonals of a rhombus are 18 and 24 inches. What is the perimeter of the rhombus in inches?



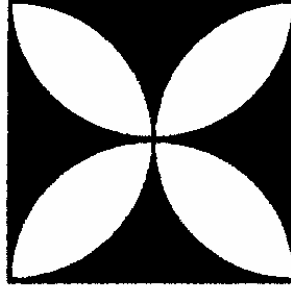
- a. 15 inches b. 42 inches c. 60 inches d. 84 inches e. NG
5. A motorist traveled 55 miles per hour for four hours and 65 miles per hour for the next six hours. What was her average speed in miles per hour for the entire trip?
- a. 58 mph b. 60 mph c. 61 mph d. 62 mph e. NG

6. Choose the equation whose graph is shown:



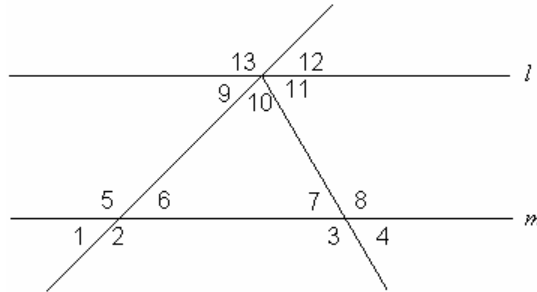
- a. $y = (x + 2)(x + 3)$ b. $y = (x - 2)(x + 3)$ c. $y = (x - 3)(x + 2)$
d. $y = (x - 3)^2$ e. NG
7. How many pairs of distinct prime numbers have a sum of 22?
a. 1 pair b. 2 pairs c. 3 pairs d. 4 pairs e. NG
8. How many outlet pipes of diameter 1.5 cm are needed to carry the same amount of water as one pipe having diameter 3 cm?
a. 2 b. 3 c. 4 d. 4.5 e. NG
9. Three fair six-sided dice of different colors are rolled. What is the probability that the product of the 3 resulting numbers is 12?
a. $\frac{5}{72}$ b. $\frac{3}{72}$ c. $\frac{1}{12}$ d. $\frac{1}{3}$ e. NG

10. Semicircles are drawn with their centers at the midpoints of the square as shown. If the length of the side of the square is 4 cm, what is the area, expressed as a decimal number of square centimeters to the nearest tenth, of the shaded portion?



- a. 6.9 cm^2 b. 9.1 cm^2 c. 12.6 cm^2 d. 12.9 cm^2 e. NG
11. If $a = \frac{-2}{3}$ and $b = \frac{3}{4}$, what is the value of $\frac{a}{b} - \frac{b}{a}$?
- a. 0 b. $\frac{1}{72}$ c. $\frac{17}{72}$ d. $2\frac{1}{72}$ e. NG
12. $y = a + \frac{b}{x}$ where a and b are constants. $y = 1$ when $x = -1$ and $y = 3$ when $x = -3$.
What is $a + b$?
- a. 3 b. 5 c. 7 d. 9 e. NG
13. $\begin{vmatrix} a & c \\ d & b \end{vmatrix} = ab - cd$ for all values of $a, b, c,$ and d .
If $\begin{vmatrix} 5 & x \\ -2 & 6 \end{vmatrix} = 8$, what is x ?
- a. 11 b. -11 c. 3 d. -3 e. NG

14. If $l \parallel m$, $\angle 1 = 40^\circ$ and $\angle 11 = 60^\circ$, what is the measure, in degrees, of angle 10?



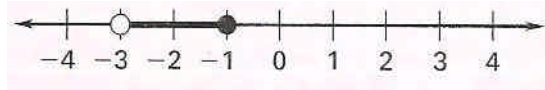
- a. 40° b. 60° c. 100° d. 140° e. NG
15. If $a + b = 11$ and $a - b = 3$, what is the value of $3a - 7b$?
- a. -37 b. -7 c. 14 d. 17 e. NG
16. How many integers satisfy both inequalities?

$$x + 3 > 5 \text{ and } |x| \leq 5.$$

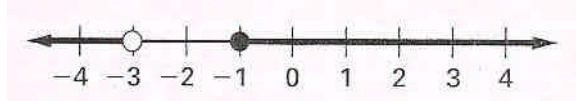
- a. 1 b. 3 c. 5 d. 7 e. NG

17. Which graph represents the solution of $3 < -2x + 1 < 7$?

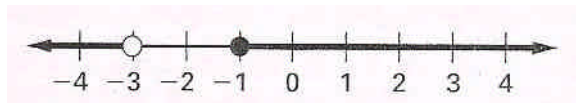
a.



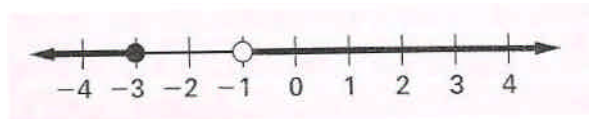
b.



c.



d.



e. NG

18. If $x = -2$, $y = 3$, and $z = 5$, what is the value of $x^y + yz + z^{x+2}$?

a. 7

b. 15

c. 23

d. 28

e. NG

19. What is the midpoint between $(10, 3)$ and $(-6, 2)$?

a. $(8, -\frac{1}{2})$

b. $(2, \frac{5}{2})$

c. $(2, -\frac{1}{2})$

d. $(-2, -\frac{5}{2})$

e. NG

20. If $2^x = 4^y$ and $3^y = 81$, what is xy ?

a. 8

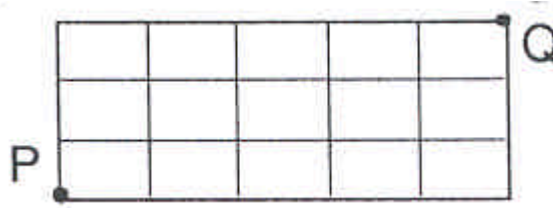
b. 12

c. 32

d. 84

e. NG

21. The grid lines below represent streets in a 5-block by 3-block area. How many different 8-block routes are there from P to Q? Each route must be along the grid lines.



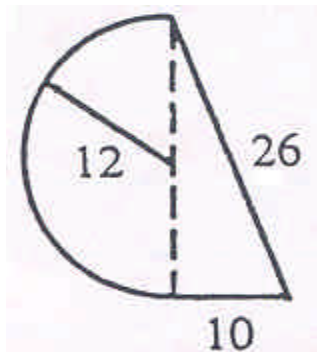
- a. 125 b. 56 c. 24 d. 8 e. NG
22. If today is Tuesday, what day will it be 777 days from today?

- a. Monday b. Tuesday c. Wednesday d. Thursday e. NG

23. Solve:

$$\frac{x-1}{6} + 2 = \frac{x+2}{3}$$

- a. -7 b. 18.5 c. 9 d. 7 e. NG
24. Find the perimeter of this figure. Dimensions are in meters. ($p = 3.14$)



- a. 73.68m b. 111.36m c. 286.08m d. 488.16m e. NG

25. Simplify: $3^3 + 3^2 [2(5-3) + \sqrt{16}]$

- a. 225 b. 99 c. 75 d. 126 e. NG

26. Factor:

$$x^2 + 3x - 10$$

- a. $(x-2)(x+5)$ b. $(x-5)(x+2)$ c. $x, -2, 5$ d. $x, -10, 3$ e. NG

27. A train traveling at 30 miles per hour is stopped $1\frac{1}{2}$ miles from its destination at 1:00 p.m. At what time would the train have arrived at its destination if it were not for the delay?

- a. 1:15 p.m. b. 1:30 p.m. c. 1:03 p.m. d. 1:05 p.m. e. NG

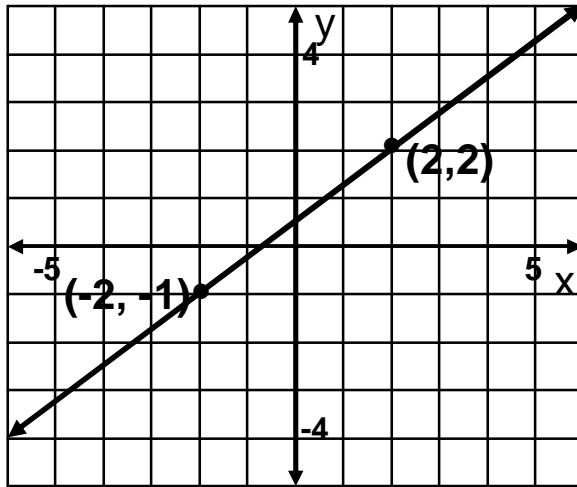
28. If $k = \frac{1}{3}$, evaluate

$$\frac{1}{k} + \frac{1}{2k}$$

Give your answer as a mixed number.

- a. 1 b. $\frac{1}{2}$ c. $\frac{99}{100}$ d. $4\frac{1}{2}$ e. NG

29. What is the equation of the line shown in the graph?



- a. $y = -\frac{3}{4}x + \frac{1}{2}$ b. $y = \frac{4}{3}x + \frac{1}{2}$ c. $y = \frac{3}{4}x - \frac{1}{2}$ d. $y = \frac{4}{3}x - \frac{1}{2}$ e. NG

30. Which of the relations below is NOT a function:

a.

| | | | | |
|---------------|---|---|---|---|
| <i>Input</i> | 1 | 2 | 3 | 4 |
| <i>Output</i> | 2 | 4 | 6 | 8 |

b.

| | | | | |
|---------------|---|---|---|---|
| <i>Input</i> | 0 | 1 | 2 | 3 |
| <i>Output</i> | 2 | 2 | 2 | 2 |

c.

| | | | | |
|---------------|---|---|---|---|
| <i>Input</i> | 0 | 1 | 1 | 2 |
| <i>Output</i> | 1 | 2 | 3 | 4 |

d.

| | | | | |
|---------------|---|---|---|---|
| <i>Input</i> | 1 | 2 | 3 | 4 |
| <i>Output</i> | 2 | 2 | 4 | 4 |

e.

| | | | | |
|---------------|---|---|---|---|
| <i>Input</i> | 1 | 2 | 3 | 4 |
| <i>Output</i> | 5 | 6 | 7 | 8 |