



An Eye on Talent

## Olympiad Aptitude Test Mathematics Class XI

1. Which equation best describes the relationship between the corresponding values of  $x$  and  $y$  shown in the table?

| $X$ | $y$ |
|-----|-----|
| -2  | -12 |
| 0   | -6  |
| 1   | -3  |
| 4   | 6   |

- a.  $y = x - 10$
- b.  $y = 2x - 8$
- c.  $y = 3x - 6$
- d.  $y = x^2 - 8$

2. For Saturday's debate tournament, Sarah ordered 3 cookies for each student participant and a tray of 30 cookies for the sponsors' hospitality room. This relationship can be expressed by the function  $f(s) = 3s + 30$ , where  $s$  is the number of student participants. Which is the dependent quantity in this functional relationship?

- a. The number of cookies ordered
- b. The number of trays ordered
- c. The number of student participants
- d. The number of sponsors

3. For the invitational math competition, Mr. Biros ordered 3 medals for each event scheduled. Mrs. Saunders ordered 5 certificates for each team that competed and 10 certificates for sponsors. This relationship can be expressed by the function  $f(t) = 5(t) + 10$ , where  $t$  is the number of teams that compete. Which is the independent quantity in this functional relationship?

- a. The number of certificates ordered
- b. The number of teams competing
- c. The number of medals ordered
- d. The number of events

4. The table shows the number of slices of pepperoni placed on each size of pizza at Pepe's Pizza Shop.

| Size of Pizza | Radius of Pizza (inches) | Number of Pepperoni Slices |
|---------------|--------------------------|----------------------------|
| Single        | 2                        | 5                          |
| Small         | 4                        | 17                         |
| Medium        | 5                        | 26                         |
| Large         | 8                        | 65                         |
| Extra large   | 10                       | 101                        |

Let  $r$  represent the radius of the pizza and let  $n$  represent the number of slices of pepperoni. Identify the equation that best represents the relationship between the radius and the number of slices of pepperoni.

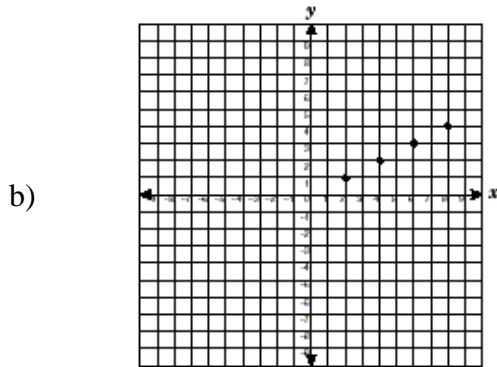
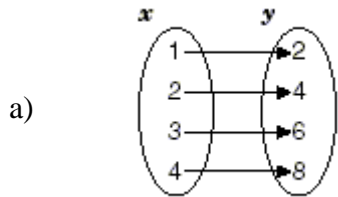
- A  $r = 2n + 1$   
 B  $n = 2r + 1$   
 C  $r = n^2 + 1$   
 D  $n = r^2 + 1$
5. A math club decided to buy T-shirts for its members. A clothing company quoted the following prices for the T-shirts.

Math Club T-Shirts

| Number of T-Shirts | Total Cost (dollars) |
|--------------------|----------------------|
| 10                 | 75                   |
| 15                 | 105                  |
| 20                 | 135                  |

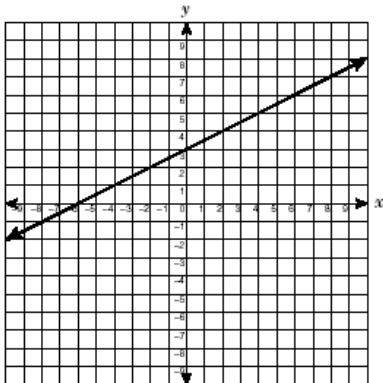
Which equation best describes the relationship between the total cost,  $c$ , and the number of T-shirts,  $s$ ?

- A  $c = 6.75s$   
 B  $c = 7.00s$   
 C  $c = 2s - 20$   
 D  $c = 15 + 6s$
6. The function  $f(x) = \{(1, 2), (2, 4), (3, 6), (4, 8)\}$  can be represented in several other ways. Which is NOT a correct representation of the function  $f(x)$ ?



- c)  $x$  is a natural number less than 5 and  $y$  is twice  $x$   
 d)  $y = 2x$  and the domain is  $\{1, 2, 3, 4\}$

7. Which linear function best describes the graph shown below?



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

8. Xavier has a Rs 25 gift certificate for a movie theater. Each time that he sees a movie,  $m$ , Rs 5 is deducted from his gift certificate balance,  $b$ . The equation  $b = 25 - 5m$  describes this relationship. Which is the dependent quantity in this functional relationship?

- a) The price of each movie ticket  
 b) The original value of the gift certificate  
 c) The balance left on the gift certificate  
 d) The number of movies he sees

9. Which of the following does not correctly represent a dependent and independent relationship?

- A. Independent variable: Time of day  
Dependent variable: Outside temperature
- B. Independent variable: Number of gallons of gas in a car's tank  
Dependent variable: Number of miles a car can be driven on a tank of gas
- C. Independent variable: Number of coins put into a gumball machine  
Dependent variable: Number of gumballs from a gumball machine
- D. Independent variable: Pace of a runner in a race  
Dependent variable: Time it takes to complete the race

10. The ordered pairs  $(-6, 18)$ ,  $(-4, 8)$ ,  $(0, 0)$ ,  $(2, 2)$ , and  $(8, 32)$  represent points on a parabola. Which equation can be used to describe this functional relationship?

- A.  $y = x$
- B.  $y = 4x$
- C.  $y = \frac{1}{2}x^2$
- D.  $y = x^2$

11. Which set of coordinates describes a function?

- a)  $\{(-5, -1), (-3, -3), (-1, -5), (-5, -7)\}$
- b)  $\{(6, 3), (4, 5), (2, 3), (0, 5)\}$
- c)  $\{(4, -3), (-4, -6), (4, 3), (-4, 6)\}$
- d)  $\{(2, 4), (2, -4), (4, 8), (6, 2)\}$

12. The cost,  $C$ , of owning a car is a function of the number of miles driven,  $m$ . This relationship is represented by the equation  $C = 0.14m + 306$ . In this relationship which is the independent quantity, when the dependent quantity is \$306?

- a) 0
- b) 0.14
- c) 21.857
- d) 612

13. For a wholesale buyer, the fixed cost of purchasing the first 20 televisions is \$480. The variable cost per television is \$12. The cost function is  $c(x) = 12x + 480$ . In this relationship, the total cost,  $c(x)$ , to the buyer is dependent on

- a) The variable cost per television
- b) The fixed cost for 20 televisions
- c) The number of televisions over 20 purchased
- d) The size of the televisions

14. Robin kept a log of the number of hours she spent birdwatching during September and the cumulative number of birds she observed.

|                     |   |    |    |    |    |    |
|---------------------|---|----|----|----|----|----|
| # of hrs (x)        | 1 | 3  | 5  | 8  | 10 | 15 |
| # of birds seen (y) | 4 | 10 | 16 | 25 | 31 | 46 |

Which equation best describes the relationship between the number of hours spent birdwatching and the number of birds seen?

- a)  $y = x + 3$
- b)  $y = 2x + 2$
- c)  $y = 3x + 1$
- d)  $y = 4x$

15. The table below shows the prices for different weights of packages of strawberries at a market.

Strawberry Prices

| Weight (lb) | Price (\$) |
|-------------|------------|
| 2           | 1.70       |
| 5           | 4.25       |
| 8           | 6.80       |
| 12          | 10.20      |

Which equation can be used to find the price,  $p$ , of any weight,  $w$ , of packages of strawberries?

- a) A  $p = 0.432w$
- b) B  $p = 0.85w$
- c) C  $p = 3.40w$
- d) D  $p = 1.70w$