

Higher Order Thinking Skills (HOTS) Questions

1. The ratio of the ages of a father and his son, 10 years ago, was 4 : 1 and that after 20 years was 7 : 4. Form two simultaneous linear equations and hence solve these two equations algebraically to find the present ages of the father and his son.
2. A company gives a fixed salary per month plus a commission on monthly sales to every new joiner in the sales team. The monthly earning is given by the following linear equation,

$$y = 20,000 + 0.05x.$$

On good performance of an individual, the company gives a hike of 10% on the fixed salary and ₹ 150 on every ₹ 3000 worth of sales. What will be the new linear equation which gives the enhanced earning.

Self-Assessment

Multiple-Choice Questions

1. The equation $3x + 7y = 9$ has a unique solution, if x and y are
 - (a) natural numbers.
 - (b) real numbers.
 - (c) positive real numbers.
 - (d) rational numbers.
2. If we multiply or divide both sides of a linear equation with a non-zero number, then the solution of the linear equation
 - (a) changes.
 - (b) remains the same.
 - (c) changes in case of multiplication only.
 - (d) changes in case of division only.
3. If three times the abscissa of a point is subtracted from four times its ordinate and then the whole expression is divided by 12, then the result becomes 3. When this statement is expressed in term of an equation it becomes
 - (a) $4y - 3x = 36$
 - (b) $3x - 4y = 36$
 - (c) $3x + 4y - 36 = 0$
 - (d) $4y + 3x + 36 = 0$
4. Which of the following is a solution of the equation $x + 2y = 7$?
 - (a) $x = 3, y = -5$
 - (b) $x = 3, y = 5$
 - (c) $x = 0, y = 7$
 - (d) $x = 3, y = 2$
5. The positive solutions of the equation $ax + by + c = 0$ always lie in the
 - (a) first quadrant.
 - (b) second quadrant.
 - (c) third quadrant.
 - (d) fourth quadrant.

Fill in the Blanks

6. The equation of x -axis is of the form _____.
7. The linear equation of the type $y = mx, m \neq 0$ has _____ solutions.
8. The negative solutions of the equation $ax + by + c = 0$ always lie in the _____ quadrant.
9. If $(2, 0)$ is a solution of the linear equation $2x + 3y - k = 0$, then the value of k is _____.

Assertion-Reason Type Questions

Directions (Q. Nos. 10 to 13): Each of these questions contains an assertion followed by a reason. Read them carefully, and answer the

question on the basis of the following options, select the one that best describes the two statements.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
 - (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
 - (c) Assertion (A) is true but Reason (R) is false.
 - (d) Assertion (A) is false but Reason (R) is true.
10. **Assertion (A):** $x + y = 0$ is a linear equation in two variables.
Reason (R): The variables x and y have non-zero coefficients.
 11. **Assertion (A):** $x = 2y$ represents the statement "ordinate of a point is twice its abscissa".
Reason (R): x -coordinate is called abscissa and y -coordinate is called ordinate.
 12. **Assertion (A):** A linear equation in two variables has infinitely many solutions.
Reason (R): A linear equation in two variables should have non-zero coefficient for two variables.
 13. **Assertion (A):** $(1, 1)$ is a solution of the equation $x + y = 1$.
Reason (R): Replacing $(1, 1)$ in the equation, we get 2.

Case Study Based Questions

14. Two friends Rahul and Anmol decided to travel the historical monuments in Delhi city. So, they book a cab for travelling. The taxi fare in the city is as follows.
 Fare for the first kilometre is ₹ 10 and ₹ 6 for every subsequent kilometre.



Based on the above information, answer the following questions.

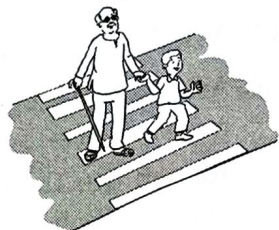
- (a) Consider the distance covered as x km and the total fare as ₹ y , form the linear equation which represents the above situation.
- (b) If they paid total fare ₹ 724, then find the total distance travelled.

- (c) (i) If the distance covered by them is 94 km, then find the total fare they have to pay.

or

- (ii) If fare for first kilometre is ₹ 10 and ₹ 4.50 for every subsequent kilometre, then what amount they have to pay for 111 km?

15. A boy walks across an x metre wide road at the speed of 1.5 m/s and crosses it in y_1 seconds. Next day, the boy is just about to cross the same



road, when he spots a visually impaired man who also wants to cross that road. He helps that man to go across by reducing his walking speed to 0.5 m/s and crosses it in y_2 seconds. Based on this situation, answer the following questions.

- (a) Write a linear equation in two variables to express relationship between x and y_1 .
 (b) Write the above equation in standard form.
 (c) (i) Write a linear equation in two variables to express relationship between x and y_2 .

or

- (ii) Find the ratio between the times taken by the boy to cross the road on the first day and the second day.

Very Short Answer Type Questions

16. What is the distance of the line $2x + 1 = 0$ from the origin?
 17. How many linear equations in x and y can be satisfied by $x = -5$ and $y = \frac{1}{3}$?
 18. If 5 pens cost ₹ 25, find graphically how many pens can be bought for ₹ 35. Also, find the cost of 3 pens.
 19. Consider the linear equation $9x - 2y = 36$. If $(k, k + 3)$ is a solution of the given linear equation, find the value of k .

Short Answer Type Questions

20. Find the solution of the linear equation $2x + 5y = 19$, whose ordinate is $\frac{3}{2}$ times its abscissa.

21. If $(3, 4)$ is a solution of the linear equation $3y = ax + 7$, then find the value of x .

22. Read the following passage and answer the questions that follows:

The residents of a housing colony are facing problem of water shortage. All residents decided to do rainwater harvesting as it helps in preserving rainwater for different purposes and for the future needs as well. One of the ways to preserve rainwater is in underground tank. The rainwater was collected in an underground tank at the rate of $0.12 \text{ m}^3/\text{hour}$.

- (a) If $x \text{ cm}^3$ of rainwater is collected in the underground tank in y minutes, then write the linear equation in two variables to express this situation.
 (b) What will be the volume of rainwater in the underground tank collected in 5 minutes?

Long Answer Type Questions

23. Solve the equation $3y - 2 = 10 - y$, and represent the solution(s) on

- (a) the number line
 (b) the Cartesian plane.

24. If the work done by a body on application of a constant force is directly proportional to the distance travelled by the body, express this in the form of an equation in two variables and draw the graph of the same by taking the constant force as 5 units. Also read from the graph, the work done when the distance travelled by the body is

- (a) 2 units
 (b) 0 unit.

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Let's Compete

Multiple-Choice Questions

1. If the linear equation has solutions $(-7, 7)$, $(0, 0)$, $(7, -7)$, then equation is
 (a) $x + y = 0$ (b) $x - y = 0$
 (c) $2x - y = 0$ (d) $x + 2y = 0$
 2. Any point on the line $y = x$ is of the form
 (a) $(k, 0)$ (b) $(0, k)$
 (c) (k, k) (d) $(k, -k)$

3. The graph of the linear equation $2x - y = 3$ cuts the y -axis at the point
 (a) $(0, -3)$ (b) $(0, 3)$
 (c) $(3, 0)$ (d) $(-3, 0)$
4. At what point does the graph of the linear equation $x + y = 10$ meet a line which is parallel to y -axis at a distance of 6 units from the origin and in the positive direction of x -axis.
 (a) $(0, 6)$ (b) $(0, 4)$
 (c) $(4, 6)$ (d) $(6, 4)$
5. The coordinates of the point on the graph of the equation $8x - 7y = 14$, whose ordinate is $\frac{6}{7}$ times its abscissa are
 (a) $(-7, 6)$ (b) $(-6, 7)$
 (c) $(6, 7)$ (d) $(7, 6)$
6. The measure of angle between the graph of the equations $y = 2$ and $x = 6$ is
 (a) 0° (b) 45°
 (c) 90° (d) None of these
7. Thrice the ordinate of point when decreased by twice the abscissa is 4. The given statement is
 (a) $3x - 2y = 4$ (b) $3y - 2x = 4$
 (c) $2x - 4 = 3y$ (d) None of these
8. The x and y intercepts made by the graph of the linear equation $7x + 8y = 5$ on the x -axis and y -axis respectively are in the ratio
 (a) $25 : 56$ (b) $56 : 25$
 (c) $8 : 7$ (d) $7 : 5$
9. The graph of linear equation $3x - y = 6$ cuts x -axis at
 (a) $(2, 0)$ (b) $(3, 0)$
 (c) $(0, -2)$ (d) $(0, -3)$
10. The number of solution(s) of the equation $3x - 2 = -2x + 1$ on the number line and on the Cartesian plane respectively is
 (a) one and two.
 (b) one and infinitely many solutions.
 (c) infinitely many solutions and one.
 (d) two and one.

— Life Skills —

1. A boy walks across an x metre wide road at a speed of 1.75 m/s and crosses it in t_1 seconds.
 (a) Write a linear equation in two variables x and t_1 to express this situation.
 (b) Next day, the boy is just about to cross the same road, when he spots a visually impaired old man who also wants to cross the road. The boy then helps that old man to go across the road by reducing his walking speed to 0.75 m/s. If t_2 seconds represents the time taken by them to cross the road, write a relationship between x and t_2 .
 (c) Hence, find the ratio between the time taken by the boy to cross the road on the first day and the second day.