MATHS

BOOKS - ZEN MATHS (KANNADA ENGLISH)

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

Illustrative Examples

1. Solve graphically the system of linear equations 4x-5y+16=0 and 2x+y-6=0.

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2. Solve graphically the pair of linear equations $3x - 4y + 3 = 0$ and $3x + 4y - 21 = 0$. Find the coordinate of the

vertices of triangular region formed by these lines and x-axis. Also calculate the area of this triangle.

3. Solve the following equation by the substitution method.

$$2x + y = 7 \quad \text{and} \quad 4x - 3 + 1 = 0$$

4. Solve the following pair of linear equations :

$$y - 4x = 1$$

$$6x - 5y = 9$$

5. A part of monthly hostel charge is fixed and the remaining depends on the number of days one has taken food in the mess. When Swati takes

food for 20 days, she has to pay Rs. 3000 as hostel charges whereas Mansi who takes food for 25 days pays Rs. 3500 as hostel charges. Find the fixed charges and cost of food per day.

6. Solve for x and y:

$$10x + 3y = 75 \quad \text{and} \quad 6x - 5y = 11$$

7. The denominator of a fraction is 4 more than twice the numerator. When both the numerator and denominator are decreased by 6, the denominator becomes 12 times the numerator. Find the fraction.

8. Solve for x and y.

$$2x = 5y + 4 \quad \text{and} \quad 3x - 2y + 16 = 0$$

9. Solve the system of equations $2x + 3y = 17$ and $3x - 2y = 6$ by the method of cross-multiplication.

10. Solve for x and y.

$$\frac{5}{x-1} + \frac{1}{y-2} = 2 \quad \text{and} \quad \frac{6}{x-1} - \frac{3}{y-2} = 1$$

11. Solve for x and y.

$$\frac{3a}{x} - \frac{2b}{y} + 5 = 0, \quad \frac{a}{x} + \frac{3b}{y} - 2 = 0 (x \neq 0, y \neq 0)$$

12. Solve for x and y

$$\frac{5}{x-1} + \frac{1}{y-2} = 2 \ \text{ and } \ \frac{6}{x-1} - \frac{3}{y-2} = 1$$

13. Solve for x and y.

$$(a-b)x + (a+b)y = a^2 - 2ab - b^2,$$

$$(a+b)(x+y) = a^2 + b^2$$

14. A boat goes 16 km upstream and 24 km downstream in 6 hours. Also it covers 12 km upstream and 36 km downstream in the same time. Find the speed of the boat in still water and that of the stream.

1. Aftab tells his daughter "Seven years ago I was seven times as old were then. Also, three years from now, I shall be three times as old as you will be". Represent the situation algebraically and graphically.

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2. The coach of a cricket team buys 3 bats and 6 balls for Rs. 3900. Later, she buys another bat and 3 more balls of the same kind for Rs. 1300. Represent this situation algebraically and geometrically.

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3. The cost of 2 kg of apples and 1 kg of grapes on a day was found to be Rs. 160. After a month, the coast of 4 kg of apples and 2 kg of grapes is Rs. 300. Represent the situation algebraically and geometrically.

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1. Form the pair of linear equations in the following problems and find their solutions graphically.

10 students of class X took part in a Mathematics quiz. If the number of girls is 4 more than the number of boys, find the number of boys and girls who took part in the quiz.

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2. Form the pair of linear equations in the following problems and find their solutions graphically.

5 pencils and 7 pens together cost Rs. 50, whereas 7 pencils and 5 pens together cost Rs. 46. Find the cost of one pencil and that of one pen.

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3. On comparing the ratios $\dfrac{a_1}{a_2}$, $\dfrac{b_1}{b_2}$ and $\dfrac{c_1}{c_2}$, find out whether the lines representing the following pairs of linear equations intersect at a point, are parallel, or coincide.

$5x - 4y + 8 = 0;\ 7x + 6y - 9 = 0$

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4. On comparing the ratios $\dfrac{a_1}{a_2}$, $\dfrac{b_1}{b_2}$ and $\dfrac{c_1}{c_2}$, find out whether the lines representing the following pairs of linear equations intersect at a point, are parallel, or coincide.

$9x + 3y + 12 = 0\ ;\ 9x + 6y + 24 = 0$

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5. On comparing the ratios $\dfrac{a_1}{a_2}$, $\dfrac{b_1}{b_2}$ and $\dfrac{c_1}{c_2}$, find out whether the lines representing the following pairs of linear equations intersect at a point, are parallel or coincident :

$$6x - 3y + 10 = 0$$

$$2x - y + 9 = 0$$

6. On comparing the ratios $\frac{a_1}{a_2}, \frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$ find out whether the following pair of linear equations are consistent, or inconsistent.

$$3x + 2y = 5, 2x - 3y = 7$$

7. On comparing the ratios $\frac{a_1}{a_2}, \frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$ find out whether the following pair of linear equations are consistent, or inconsistent.

$$2x - 3y = 8, 4x - 6y = 9$$

8. On comparing the ratios $\dfrac{a_1}{a_2}, \dfrac{b_1}{b_2}$ and $\dfrac{c_1}{c_2}$ find out whether the following pair of linear equations are consistent, or inconsistent.

$$\frac{3}{2}x + \frac{5}{3}y = 7, \; 9x - 10y = 14$$

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9. On comparing the ratios $\dfrac{a_1}{a_2}, \dfrac{b_1}{b_2},$ and $\dfrac{c_1}{c_2},$ find out whether the following pairs of linear equations are consistent or inconsistent.

$$5x - 3y = 11, \; -10x + 6y = -22$$

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10. On comparing the ratios $\dfrac{a_1}{a_2}, \dfrac{b_1}{b_2}$ and $\dfrac{c_1}{c_2}$ find out whether the following pair of linear equations are consistent, or inconsistent.

$$\frac{4}{3}x + 2y = 8, \; 2x + 2y = 12$$

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11. Which of the following pairs of linear equations are consistent/ inconsistent? If consistent, obtain the solution graphically.

$x + y = 5, 2x + 2y = 10$

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12. Which of the following pairs of linear equations are consistent/inconsistent? If consistent, obtain the solution graphically.

$x - y = 8, 3x - 3y = 16$

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13. Which of the following pairs of linear equations are consistent/inconsistent? If consistent, obtain the solution graphically.

$2x + y - 6 = 0, 4x - 2y - 4 = 0$

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14. Which of the following pairs of linear equations are consistent/inconsistent? If consistent, obtain the solution graphically.

$2x - 2y - 2 = 0, 4x - 4y - 5 = 0$

15. Half the perimeter of a rectangular garden, whose length is 4 more than its width, is 36 m. Find the dimensions of the garden.

16. Given the linear equation $3x + 2y - 8 = 0$, write another linear equation in two variables such that the geometric representation of the pair so formed is:

(i) Intersecting lines (ii) Parallel lines

(iii) Coincident lines

17. Draw the graphs of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the co-ordinates of the vertices of the triangle formed by these lines and the x-axis and shade the triangular region.

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1. Solve the following pair of linear equations by the substitution method.

$x + y = 14$

$x - y = 4$

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2. Solve the following pair of linear equations by the substitution method.

$s - t = 3$

$\dfrac{s}{3} + \dfrac{t}{2} = 6$

3. Solve the following pairs of linear equations by the substitution method.

$$3x - y = 3$$

$$9x - 3y = 9$$

4. Solve the following pairs of linear equations by the substitution method.

$$0.2x + 0.3y = 1.3$$

$$0.4x + 0.5y = 2.3$$

5. Solve the following pairs of linear equations by the substitution method.

$$\sqrt{2}x + \sqrt{3}y = 0$$

$$\sqrt{3}x - \sqrt{8}y = 0$$

6. Solve the following pair of linear equations by the substitution method.

$$\frac{3x}{2} - \frac{5y}{3} = -2, \quad \frac{x}{3} + \frac{y}{2} = \frac{13}{6}$$

7. Solve $2x + 3y = 11$ and $2x - 4y = -24$ and hence find the value of

'm' for which $y = mx + 3$.

8. Form the linear equations for the following problems and find their

solution by substitution method.

The difference between two numbers is 26 and one number is three times the other. Find them.

9. From the pair of linear equations for the following problems and find their solution by substitution method.

The larger of two supplementary angles exceeds the smaller by 18 degrees. Find them.

10. From the pair of linear equations for the following problems and find their solution by substitution method.

The coach ofa a cricket team buys 7 bats and 6 balls for Rs. 3800. Later, she buys 3 bats and 5 balls for Rs. 1750. Find the cost of each bat and each ball.

11. From the pair of linear equations for the following problems and find their solution by substitution method.

The taxi charge in a city consist of a fixed charge together with the charge for the distance covered. For a distance of 10 km, the charge paid is Rs. 105 and for a journey of 15 km, the charge paid is Rs. 155. What are the fixed charges and the charge per km ? How much does a person have to pay for travelling a distance of 25 km ?

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12. Form the linear equations for the following problems and find their solution by substitution method.

A fraction becoms $\dfrac{9}{11}$ if 2 added to both the numerator and denominator. If 3 is added to both numerator and denominator it becomes $\dfrac{5}{6}$. Find the fraction.

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13. Form the linear equations for the following problems and find their solution by substitution method.

Five years hence, the age of Jacob will be three times that of his son. Five years ago, Jacob's age was seven times that of his son. What are their present ages?

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Textual Exercise 3 4

1. Solve the following pairs of linear equation by the elimination method and the substitution method.

$x + y = 5$ and $2x - 3y = 4$

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2. Solve the following pairs of linear equation by the elimination method and the substitution method.

$$3x + 4y = 10 \quad \text{and} \quad 2x - 2y = 2$$

3. Solve the following pairs of linear equation by the elimination method and the substitution method.

$$3x - 5y - 4 = 0 \quad \text{and} \quad 9x = 2y + 7$$

4. Solve the following pair of linear equations by the elimination method and the substitution method.

$$\frac{x}{2} + \frac{2y}{3} = -1 \quad \text{and} \quad x - \frac{y}{3} = 3$$

5. Form the pair of linear equations in the following problems, and find their solutions (if they exist) by the elimination method :

If we add 1 to the numerator and subtract 1 from the denominator, a fraction reduces to 1. it becomes $\frac{1}{2}$ if we only add 1 to the denominator. What is the fraction ?

6. Form the pair of linear equations in the following problems, and find their solutions (if they exist) by the elimination method :

Five years, ago Nuri was thrice as old as Sonu. Ten years later, Nuri will be twice as old as Sonu. How old are Nuri and Sonu ?

7. Form the pair of linear equations in the following problems, and find their solutions (if they exist) by the elimination method :

The sum of the digits of a two-digit number is 9. also, nine times this number is twice the number obtained by reversing the order of the digits. Find the number.

8. Form the pair of linear equations in the following problems, and find their solutions (if they exist) by the elimination method :

Meena went to a bank to withdraw Rs. 2000. She asked the cashier to give her Rs. 50 and Rs. 100 notes only. Meena got 25 nots. in all. find how many notes of Rs. 50 and Rs. 100 she received.

9. Form the pair of linear equations in the following problems, and find their solutions (if they exist) by the elimination method :

A leanding library has a fixed charge for the first three days and an additional charge for each day thereafter. Sarita paid Rs. 27 for a book kept for seven days, while Susy paid Rs. 21 for the book she kept for five days. Find the fixed charge and the charge for each extra day.

1. Which of the following pairs of linear equations has unique solution, no solution, or infinitely many solution, no solution, or infinitely many solutions. In case there is a unique solution, find it by using cross multiplication method.

$x - 3y - 3 = 0$ and $3x - 9y - 2 = 0$

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2. Which of the following pairs of linear equations has unique solution, no solution, or infinitely many solution, no solution, or ininitely many solutions. In case there is a unique solution, find it by using cross multiplication method.

$2x + y = 5$ and $3x, 2y = 8$

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3. Which of the following pairs of linear equations has a unique solution, no solution, or infinitely many solutions? In case, there is a unique solution, find it by using cross-multiplication method.

$$3x - 5y = 20$$

$$6x - 10y = 40$$

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4. Which of the following pairs of linear equations has unique solution, no solution, or infinitely many solution, no solution, or ininitely many solutions. In case there is a unique solution, find it by using cross multiplication method.

$$x - 3y - 7 = 0 \text{ and } 3x - 3y - 15 = 0$$

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5. For which values of a and b does the following pair of linear equatons have an infinite number of solutions ?

$$2x + 3y = 7$$

$$(a - b)x + (a + b)y = 3a + b - 2$$

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6. For which value of k will the following pair of linear equations have no solutions?

$$3x + y = 1$$

$$(2k - 1)x + (k - 1)y = 2k + 1$$

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7. Solve the following pair of linear equations by the substitution and cross-multiplication methods.

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8. Form the pair of linear equations in the following problems and their solutions (if they exist) by any algebraic method.

A part of monthly hostel charges is fixed and the remaining depends on the number of days one has taken food in the mess. When a student A takes food for 20 days she pays Rs. 1000 as hostel charges whereas a student B, who takes food for 26 days pays Rs. 1180 as hostel charges. Find the fixed charges and the cost of food per day.

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9. Form the pair of linear equations in the following problems and their solutions (if they exist) by any algebraic method.

A fraction becomes $\dfrac{1}{3}$ when 1 is subtracted from the numerator and becomes $\dfrac{1}{4}$ when 8 is added to the denominator. Find the fraction.

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10. Form the pair of linear equations in the following problems and their solutions (if they exist) by any algebraic method.

Yash scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each incorrect answer, then Yash would have scored 50 marks. How many questions were there in the test?

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11. Form the pair of linear equations in the following problems and their solutions (if they exist) by any algebraic method.

Places A and B are 100 km apart on a highway. One car starts from A and another from B at the same time. If the cars travel in the same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What are the speeds of the two cars?

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12. Form the pair of linear equations in the following problems and their solutions (if they exist) by any algebraic method.

The area of a rectangle gets reduced by 9 square units, if its length is reduced by 5 units and breadth is increased by 3 units. If we increase the length by 3 units and the breadth by 2 units, the area increases by 67 square units. Find the dimensions of the rectangle.

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Textual Exercise 3 6

1. Solve the following pairs of equations by reducing them to a pair of linear equations.

$$\frac{1}{2x} + \frac{1}{3y} = 2$$
$$\frac{1}{3x} + \frac{1}{2y} = \frac{13}{6}$$

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2. Solve the following pairs of equations by reducing them to a pair of linear equations.

$$\frac{2}{\sqrt{x}} + \frac{3}{\sqrt{y}} = 2$$

$$\frac{4}{\sqrt{x}} - \frac{9}{\sqrt{y}} = -1$$

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3. Solve the following pairs of equations by reducing them to a pair of linear equations.

$$\frac{4}{x} + 3y = 14$$

$$\frac{3}{x} - 4y = 23$$

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4. Solve the following pairs of equations by reducing them to a pair of linear equations.

$$\frac{5}{x-1} + \frac{1}{y-2} = 2 \quad \text{and} \quad \frac{6}{x-1} - \frac{3}{y-2} = 1$$

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5. Solve the following pairs of equations by reducing them to a pair of linear equations.

$$\frac{7x - 2y}{xy} = 5$$

$$\frac{8x + 7y}{xy} = 15$$

6. Solve the following pairs of equations by reducing them to a pair of linear equations.

$$6x + 3y = 6xy$$

$$2x + 4y = 5xy$$

7. Solve the following pairs of equations by reducing them to a pair of linear equations.

$$\frac{10}{x+y} + \frac{2}{x-y} = 4$$

$$\frac{15}{x+y} - \frac{5}{x-y} = -2$$

8. Solve the following pairs of equations by reducing them to a pair of linear equations.

$$\frac{1}{3x+y} + \frac{1}{3x-y} = \frac{3}{4}$$

$$\frac{1}{2(3x+y)} - \frac{1}{2(3x-y)} = \frac{-1}{8}$$

9. Anirudh can row downstream 20km in 2 hours, and upstream 4 km in 2 hours. Find his speed of rowing in still water and speed of the current.

OR

Adithya travels 300 km to her house partly by bus. She taken 4 hours if she travels 60km by train and the remaining by bus. If she travels 100 km

by train and the remaining by bus, she takes 10 min longer. find the speed of the train and the bus separately.

10. Formulate the following problems as a pair of equations.

2 women and 5 men can together finish an embroidery work in 4 days, while 3 women and 6 men finish it in 3 days. Find the time taken by 1 woman alone to finish the work and also that taken by 1 man alone.

11. Formulate the following problems as a pair of equations.

Roohi travels 300 km to her home partly by train and partly by bus. She takes 4 hours if she travels 60 km by train and the remaining by bus. If she travels 100 km by train and the remaining by bus, she takes 10 minutes longer. Find the speed of the train and bus separately.

1. The ages of two friends Ani and Biju differ by 3 years. Anil's father Dharam is twice as old as Ani and Biju is twice as old as his sister Cathy. The ages of Cathy and Dharam differ by 30 years. Find the ages of Ani and Biju.

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2. One says, 'Give me a hundred, friend! I shall then become twice as rich as you. The other replies, 'If you give me ten, I shall be six times as rich as you. Tell me what is the amount of their respective capital.

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3. A train covered a certain distance at a uniform speed. If the train would have been 10 km/hr faster, it would have taken 2 hours less than the

scheduled time. And, if the train were solwer by 10 km/hr, it would have taken 3 hours more than the scheduled time. Find the distance. covered by train.

4. The students of a class are made to stand in rows. If 3 students are extra in a row, there would be 1 row less. If 3 students are less in a row there would be 2 rows more. Find the number of students in the class.

5. In a $\triangle ABC$, $|\underline{C} = 3|\underline{B} = 2(|\underline{A} + |\underline{B})$.

Find the three angles.

6. Draw the graphs of the equations $5x - y = 5$ and $3x - y = 3$. Determine the coordinates of the vertices of the triangle formed by these lines and y-axis.

7. Solve the following pairs of linear equations

$px + qy = p - q$ and

$qx - py = p + q$

8. Solve the following pairs of linear equations

$ax + by = c$

$bx + ay = 1 + c$

9. Solve the following pairs of linear equations

$$\frac{x}{a} - \frac{y}{b} = 0$$

$$ax + by = a^2 + b^2$$

10. Solve the following pairs of linear equations

$$(a - b)x + (a + b)y = a^2 - 2ab - b^2$$

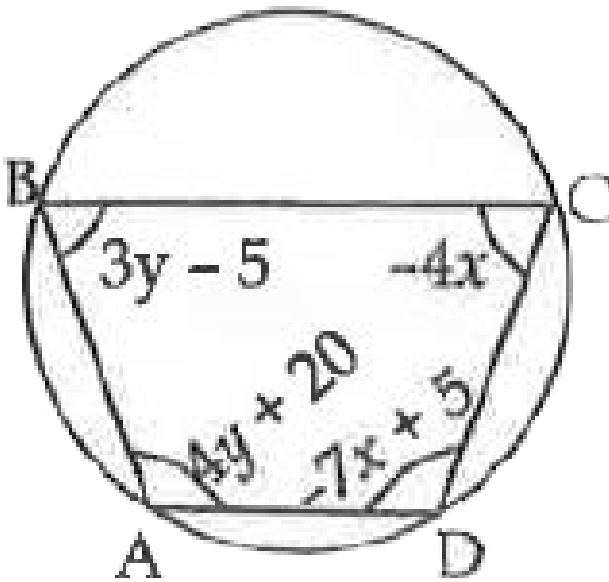$$(a + b)(x + y) = a^2 + b^2$$

11. Solve the following pairs of linear equations

$$152x - 378y = -74$$

$$-378x + 152y = -604$$

12. ABCD is a cyclic quadrilateral. Find the angles of the cyclic quadrilateral.

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1. The graph of the equations $6x - 2y + 9 = 0$ and $3x - y + 12 = 0$ are two lines which are

A. Coincident

B. Parallel

C. Intersecting at one point

D. Perpendicular to each other

Answer: B

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2. The pair of equations $2x + 3y = 5$ and $4x + 6y = 15$ has

A. Unique solution

B. Exactly two solutions

C. Many solutions

D. No solution

Answer: D

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3. For what values of k do the pair of equations $x - 2y = 3$ and $3x + ky = 1$ have a unique solution?

A. $k = -6$

B. k = 0 only

C. $k \neq 0$

D. $k \neq -6$

Answer: D

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4. If a pair of linear equations is consistent, then their graph lines will be

A. Always intersecting

B. Always coincident

C. Parallel

D. Intersecting or coincident

Answer: D

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5. If a pair of linear equations is inconsistent, then their graph lines will

be

    A. Always intersecting

    B. Always coincident

    C. Parallel

    D. Intersecting or coincident

Answer: C

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6. On solving $\dfrac{2}{3}x + 5y = 12$ and $x + \dfrac{3}{2}y = 6$, we get

A. x = 3, y = 2

B. x = 6, y = 1

C. x = -3, y = -2

D. x = 6, y = 2

Answer: A

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7. In a cyclic quadrilateral ABCD, it is given :

$\angle A = (x + y + 10)^\circ, \angle B = (y + 20)^\circ, \angle C = (x + y - 30)^\circ$ and $\angle D =$

. Find $\angle B$.

A. 70°

B. 80°

C. 100°

D. $110°$

Answer: B

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8. In $\triangle ABC$, $\angle C = 3$, $\angle B = 2(\angle A + \angle B)$ then $\angle B =$ _____

A. $20°$

B. $40°$

C. $60°$

D. $80°$

Answer: B

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9. The area of the triangle formed by the lines y = x, x = 6, and y = 0 is

A. 72 square units

B. 36 square units

C. 18 square units

D. 9 square units

Answer: C

10. If $2x - 3y = 7$ and $(a + b)x - (a + b - 3)y = 4a + b$ represent coincident lines, then a and b satisfy the equation :

A. a+5b=0

B. 5a+b=0

C. a-5b=0

D. 5a-b=0

Answer: C

11. Aruna has only Rs. 1 and Rs. 2 coins with her. If the total number of coins that she has is 50 and the amount of money with her is Rs. 75, then the number of Rs. 1 and Rs. 2 coins are respectively,

A. 35 and 15

B. 35 and 20

C. 15 and 35

D. 25 and 25

Answer: D

12. The father's age is six times his son's age. Four years hence the age of the father will be four time his son's age. The present age (in years) of the son and the father are respectively,

A. 4 and 24

B. 5 and 30

C. 6 and 36

D. 3 and 24

Answer: C

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13. The lines represented by 2x+3y-9 =0 and 4x+6y-18=0 are

A. Intersecting lines

B. Perpendicular lines to each other

C. Parallel lines

D. Coincident lines

Answer: D

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14. If the lines drawn to the linear equations of the type $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are coincident on each other, then the correct relation among the following is

A. $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} = \dfrac{c_1}{c_2}$

B. $\dfrac{a_2}{a_2} \neq \dfrac{b_1}{b_2} \neq \dfrac{c_1}{c_2}$

C. $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} \neq \dfrac{c_1}{c_2}$

D. $\dfrac{a_1}{a_2} \neq \dfrac{b_1}{b_2} = \dfrac{c_1}{c_2}$

Answer: A

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15. In the pair of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2y + b_2y + c_2 = 0$ if $\dfrac{a_1}{a_2} \neq \dfrac{b_1}{b_2}$ then the

A. equations have no solution

B. equations have unique solution

C. equations have three solutions

D. equations have infinitely many solutions

Answer: B

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1. Find the value of k for which the pair of linear equations

$kx + 3y = k - 2$ and $12x + ky = k$ has no solution.

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2. Find the value of 'a' so that the point (3, a) lies on the line 2x - 3y = 5.

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3. Find the number of solutions of the following pair of linear equations.

$x + 2y = 8, 2x + 4y = 16$

4. Write whether the following pair of linear equations is consistent or not.

$x + y = 14, x - y = 4$

5. If x = a and y = b is the solution of the pair of equations $x - y = 2$ and $x + y = 4$, find the values of a and b.

6. Solve for x and y: $2x + 3y = 7$ and $6x + 5y = 11$.

7. Show that x = 3 and y = -2 is the solution of the system of linear

equations $x + 2y = -1$ and $2x - 3y = 12.$

8. Solve for x and y: $x + y = 8$ and $2x - 3y = 1.$

9. 5 chewing gum and 6 candies cost Rs. 9 and 3 chewing gum and 2

candies cost Rs. 5. Find the cost of 1 chewing gum and 1 candy.

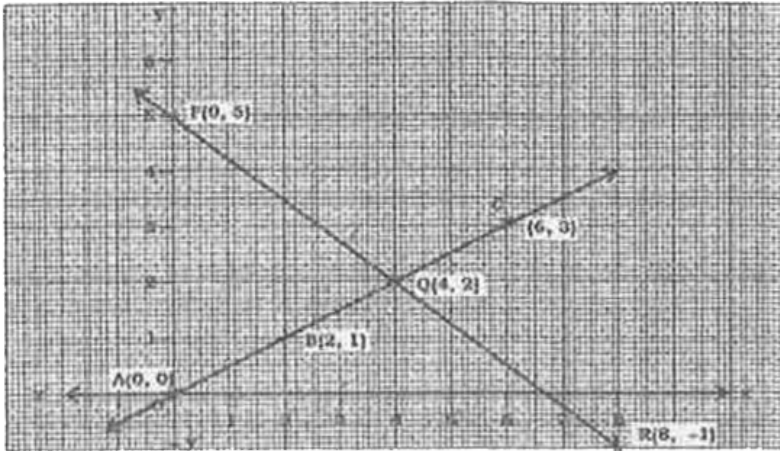**10.** Find the value of k for which the pair of linear equations

$kx + 2y = 3$ and $3x + 6y = 10$ has a unique solution.

11. The given graph represents a pair of linear equations in two variables :

write how many solutions these pair of equations have

12. If a pair of linear equations represented by lines has no solutions (inconsistent) then write what kinds of lines are these.

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1. Without drawing the graph, find out if the lines representing the following pair of linear equations intersecting at a point is parallel or coincident.

$$18x - 7y + 24 = 0, \quad \frac{9x}{5} - \frac{7y}{10} + \frac{9}{10} = 0$$

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2. Find the value of k for which the following pair of linear equations has infinitely many solutions.

$$2x + 3y = 7 \quad \text{and} \quad (k-1)x + (x+2)y = 3k.$$

3. Solve : $99x + 101y = 499$

$101x + 99y = 51$

4. Find the values of k so that the pair of equations $x + 2y = 5$ and $3x + ky + 15 = 0$ has unique solution.

5. Sumit is three times as old as his son 5 years later, he shall be two and a half times as old as his son. How old is Sumit at present?

6. A father's age is three times the sum of the ages of his two children. After 5 years his age will be 2 times the sum of their ages. Find the present age of the father.

7. Difference of two numbers is 13 and their sum is 35. What are the numbers?

8. Find those integral values of m for which the x-coordinate of the point of intersection of lines represented by $y = mx + 1$ and $3x + 4y = 9$ is an integer.

9. Solve the following pair of linear equations by any suitable method.

x+y = 5   2x-3y=5

10. Solve:

$$2x + y = 11$$

$$x + y = 8$$

11. Find the value of k, if the pair of linear equations

$2x - 3y = 8$ and $2(k - 4)x - ky = k + 3$ are inconsistent.

Additional Questions Short Answers Sa Type Ii Questions

1. For which value(s) of λ do the pair of linear equations $\lambda x + y = \lambda^2$ and $x + \lambda y = 1$ have

i] No solution?   ii] Inifinitely many solutions?

iii] A unique solution?

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2. Given a linear equation $3x - 5y = 11$. Form another linear equation in these variables such that the geometric representation of the pair so formed is

i] Intersecting line   ii] Coincident

iii] Parallel

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3. Solve for x and y:

$0.4x - 1.5y = 6.5, 0.3x + 0.2y = 0.9$

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4. Solve for x and y: $ax + by = 1$ and $bx + ay = \dfrac{2ab}{a^2 + b^2}$.

5. Find thhe solution of the pair of equations $\dfrac{3}{x} + \dfrac{8}{y} = -1$ and $\dfrac{1}{x} - \dfrac{2}{y} = 2$ where $x, y \neq 0$.

6. Find the relation between p and q if x = 3 and y = 1 is the solution of the pair of equations

$x - 4y + p = 0$ and $3x + y - q - 2 = 0$.

7. The sum of the digits of a two digit number is 12. The number obtained by interchanging the two digits exceeds the given number by 18. Find the number.

8. A fraction becomes 1/3 when 2 is subtracted from the numerator and becomes 1/2 when 1 is subtracted from the denominator. Find the fraction.

9. Two numbers are in the ratio 5:6. If 8 is subtracted from each of the numbers, the ratio becomes 4 : 5. Find the numbers.

10. A part of monthly hostel charges in a college hostel are fixed and the remaining depends on the number of days one has taken food in the mess. When a studentt 'A' takes food for 25 days he has to pay Rs. 4500 where as a student B who takes food for 30 days pays Rs. 5200. Find the fixed charges per month and the cost of food per day.

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11. ABCDE is a pentagon with BE || CD and BC || DE. BC is perpendicular to CD. If the perimeter of ABCDE is 21 cm, find the value of x and y.

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12. 4 men and 6 boys can finish a piece of work in 5 days while 3 men and 4 boys can finish in 7 days. Find the time taken by 1 man alone and 1 boy alone to finish the piece of work.

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1. Draw the graph of the following equations

$x + y = 5, x - y = 5.$

a] Find the solution of the equations from the graph.

b] Shade the triangular region formed by the lines and the y-axis.

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2. Solve the following pair of linear equations graphically :

$x + 3y = 6$ and $2x - 3y = 12$. Also find the area of the triangle formed by the lines representing the given equation, with y-axis.

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3. Places A and B are 160 km apart on a highway. One car starts from A and another from B at the same time. If they travel in the same direction they meet in 8 hours. But if they travel towards each other, they meet in 2

hours. Find the speed of each car. Let P and Q be the cars (1) starting from A and B respectively.

4. Five years ago, A was thrice as old as B and ten years later A shall be twice as sold as B. What are the present ages of A and B?

5. The ratio on incomes of two persons is 9 : 7 and the ratio of their expenditure is 4 : 3. If each of them manages to save Rs. 2000 per month, find their monthly incomes and expenditures.

6. Places P_1 and P_2 are 250 km apart from each other on a national high way. A car starts from P_1 and another from P_2 at the same time. If

they go in the same direction then they meet in 5 hours. If they go in opposite directions they meet in 25/13 hours. Find their speeds.

7. Priya travels 300 km to her home partly by train and partly by bus. She takes 4 hours if she travels 60 km by train and the remaining by bus If she travels 100 km by train and the remaining by bus, she takes 10 minutes longer. Find the speed of the train and the bus separately.

8. It takes 12 hours to fill a swimming pool using two pipes. If the pipe of longer diameter is used for 4 hours and the pipe of smaller diameter is used 9 hours, one half of the pool is filled. How long would it take for each pipe to fill the pool separately.

9. In a competitive examination, 1 mark is awarded for each correct answer, while $1/2$ mark is deducteed for every wrong answer. Jayanti answered 120 questions and got 90 marks. How many questions did she answer correctly?

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10. The owner of a taxi company decides to run all the taxis on CNG fuel instead of petrol/diesel. Taxi charges in city comprise of fixed charges together with the charge for the distance covered. For a journey of 13 km, the charge is Rs. 129 and for a journey of 22 km, the charge is Rs. 210.

[i]What will a person have to pay for traveling a distance of 32 km?

(ii) Why did he decided to use CNG for his taxi as fuel

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11. Find the sol.n of the following pair of linear by the graphical method.

$2x + y = 6$

$$2x - y = 2$$

Additional Questions Higher Order Thinking Skills Hots

1. Solve for x and y in the following question :

$$\frac{2}{x + 2y} + \frac{1}{2x - y} + \frac{5}{9} = 0, \quad \frac{9}{x + 2y} + \frac{6}{2x - y} + 4 = 0$$

A. x = 1, y = 2

B. x = 2, y = 1

C. x = 2, y = 1/2

D. x = 1/2, y = 2

Answer: D

2. Solve the following pair of linear equations :

$152x - 378y = -74$ and $-378x + 152y = -604$

A. 1

B. 2

C. 4

D. 3

Answer: B

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3. $ax + by + c = 0$ does not represent an equation of a line when _____

A. $a = c = 0, b \neq 0$

B. $b = c = 0, a \neq 0$

C. $a = b = 0$

D. $a = b \neq 0$

Answer: C

4. The graph of x = 5 is perpendicular to

    A. x - axis

    B. y - axis

    C. line y = x

    D. line y = -x

Answer: A

5. If the system of equations

$$2x + 3y = 7, \ 2ax + (a + b)y = 28$$

has many solutions, then _____

A. a = 2b

B. b = 2a

C. $a + 2b = 0$

D. $2a + b = 0$

Answer: B

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6. The solution of the system of equations $\dfrac{2x + 5y}{xy} = 6$ and $\dfrac{4x - 5y}{xy} + 3 = 6$ (where x = 0, y = 0) respectively is

_____

A. 1, 2

B. 0, 0

C. $-1, 2$

D. 1, -2

Answer: A

---

7. The graph of y = 1 is a line parallel to _____

A. x - axis

B. y - axis

C. Both x and y axis

D. Line y = x

Answer: A

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8. For what value of k do the set of equations

$4x - (3x + 2)y = 20$ and $(11k - 3)x - 10y = 40$ have infinite

solutions ?

A. -1

B. 1

C. 2

D. 3

Answer: B

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9. The sum of the successors of two numbers is 42 and the difference of their predecessors is 12. Find the numbers.

A. 54 and 30

B. 4 and 14

C. 26 and 14

D. 27 and 15

Answer: C

10. Four years ago, the age of a person was thrice that of his son. Eight years later, the age of the person will be twice that of his son. Find the present ages of the person and his son.

    A. 30 and 10

    B. 30 and 8

    C. 40 and 16

    D. 45 and 20

Answer: C

11. Determine algebraically the vertices of the triangle formed by the lines

$3x - y = 3, 2x - 3y = 2,$ and $x + 2y = 8.$

12. Susan invested certain amount of money in two schemes A and B which offer interest at the rate of 8% per annum and 9% per annum, respectively. She received Rs. 1860 as annual interest. However had she interchanged the amount of investments in the two schemes, she would have received Rs. 20 more as annual interest. How much money did she invest in each scheme?

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