MATHEMATICS

Class-IX

Topic-4

LINEAR EQUATIONS

CH-04
LINEAR EQUATIONS

(A) INTRODUCTION TO EQUATION

(a) Linear equation in one variable

An equation of the form **ax + b = 0** where **a** and **b** are real numbers, a $\neq$ 0 and **'x'** is a variable, is called a **linear equation in one variable**.
Here **'a'** is called **coefficient** of x and **'b'** is called as a **constant term**. i.e. 3x + 5 = 0, 7x – 2 = 0 etc.

(b) Linear equation in two variable

An equation of the form Ax + By + C = 0 is called a linear equation.
Where A is called coefficient of x, B is called coefficient of y and C is the constant term (free from x & y)
A, B, C $\in$ R [$\in$ → belongs to, R → Real No.]
But A and B can not be simultaneously zero.
If A $\neq$ 0, B = 0 equation will be of the form Ax + C = 0.   [Line || to Y-axis]

If A = 0, B $\neq$ 0 , equation will be of the form By + C = 0.   [Line || to X-axis]

If A $\neq$ 0 , B $\neq$ 0 , C = 0 equation will be of the form A x + By = 0.   [Line passing through origin]

If A $\neq$ 0 , B $\neq$ 0 , C $\neq$ 0 equation will be of the form A x + By + C = 0.

It is called a linear equation in two variable because the two unknowns (x & y) occurs only in the first power, and the product of two unknown quantities does not occur.

Since it involves two variables therefore a single equation will have infinite set of solution i.e. indeterminate solution. So we require a pair of equation i.e. simultaneous equations.

(c) Solution of a Linear equation in two variable

A linear equation in two variables has infinitely many solutions.A solution means an ordered pair(x,y) of values which satisfy the given equation. To find solutions we express one variable in terms of another variable. Then we put the values of the first variable to get the values of the second variable.

Solved Examples

Example 1
    Prove that x = 3, y = 2 is a solution of 3x – 2y = 5.

Sol.   x = 3, y = 2 is a solution of 3x – 2y = 5, because L.H.S.= 3x – 2y = 3 × 3 – 2 × 2 = 9 – 4 = 5 = R.H.S.
    i.e.   x = 3, y = 2 satisfied the equation 3x – 2y = 5 .
     It is a solution of the given equation.

Example 2

    Find 3 solutions of the equation, 5x – 6y + 6 = 0

Sol.   To make calculations easier, we rewrite the equation as, y = (5x + 6)/6
    Now we may substitute any value for x and calculate the corresponding value of y.
    Take x = 0, then y = 1.
    Take x = 6, then y = 6
    Take x = – 6, then y = – 4
    Therefore three solutions are, x = 0, y = 1; x = 6, y = 6 and x = – 6, y = – 4

Example 3

Find 3 solutions of the equation, $2x = 6 - 5y$

Sol. Rewrite the equation as $x = (6 - 5y)/2$

Take $y = 0$, then $x = 3$

Take $y = -2$, then $x = 8$

Take $y = 2$, then $x = -2$

Therefore 3 solutions are: $x = 3, y = 0$; $x = 8$, $y = -2$; $x = -2, y = 2$

Check Your Level

1. Which of the following equations are linear?

    (a) $4x + y^2 - 1 = 0$ **(b)** $x - y = 0$ **(c)** $y^2 = 4x - 1$

    (d) $9x + 5 = 4y - 1$ **(e)** $3x - 5 = 0$

2. Express the following equations in the form $ax + by + c = 0$, and write the values of a, b and c

    (a) $5x = 7y + 1$ **(b)** $8y - 3x = 1$ **(c)** $3x = 5y$

    (d) $9x - 4 = 0$ **(e)** $7y + 4 = 0$

3. Express the following equations in the form $y = mx + c$ and write the values of m and c.

    (a) $6x + 7y = 3$ **(b)** $3x - 4y + 2 = 0$

    (c) $6y + 7x - 2 = 0$ **(d)** $3x - 5y - 2 = 0$

4. Write down any 3 solutions of the following equations.

    (a) $4x - 7y + 2 = 0$ **(b)** $2x - y = 6$

    (c) $x + 3y - 6 = 0$ **(d)** $10x - 9y + 5 = 0$

5. Rahul purchased some red T−shirts and some white T−shirts at Rs 150 and Rs 225 respectively. If number of red T-shirts is x and the number of white T-shirts is y, then write a linear expression in x and y to denote his total bill which came out to be Rs 900.

Answers

1. **(b)**, **(d)**, **(e)**

2. **(a)** $5x - 7y - 1 = 0$; $a = 5, b = -7, c = -1$ **(b)** $-3x + 8y - 1 = 0$; $a = -3, b = 8, c = -1$

    (c) $3x - 5y = 0$; $a = 3, b = -5, c = 0$ **(d)** $9x - 4 = 0$; $a = 9, b = 0, c = -4$

    (e) $7y + 4 = 0$; $a = 0, b = 7, c = 4$

3. **(a)** $y = \dfrac{-6}{7}x + \dfrac{3}{7}$; $m = \dfrac{-6}{7}$, $c = \dfrac{3}{7}$ **(b)** $y = \dfrac{3}{4}x + \dfrac{1}{2}$; $m = \dfrac{3}{4}$, $c = \dfrac{1}{2}$

    (c) $y = \dfrac{-7}{6}x + \dfrac{1}{3}$; $m = \dfrac{-7}{6}$, $c = \dfrac{1}{3}$ **(d)** $y = \dfrac{3}{5}x - \dfrac{2}{5}$; $m = \dfrac{3}{5}$, $c = \dfrac{-2}{5}$

4. **(a)** $x = 3, y = 2$; $x = -4, y = -2$; $x = 10, y = 6$ **(b)** $x = 3, y = 0$; $x = 4, y = 2$; $x = 5, y = 4$

    (c) $x = 6, y = 0$; $x = 3, y = 1$; $x = 0, y = 2$ **(d)** $x = 4, y = 5$; $x = -5, y = -5$; $x = 13, y = 15$

5. $150x + 225y = 900$

(B)   METHODS OF SOLVING LINEAR EQUATION IN TWO VARIABLE

(a)   Graphical Method of Solving Linear Equations in Two Variables

      (i)   Graphs of the type $ax + 0.y = c$ are parallel to y - axis

      (ii)   Graphs of the type $0.x + b.y = c$ are parallel to x - axis

      (iii)   Graphs of the type $ax + by + c = 0$ makes intercept on x-axis and y-axis

Solved Examples

Example 4

    Solve the equation $2x + 1 = x - 3$, and represent the solution(s) on (i) the number line, (ii) the Cartesian plane

Sol.   We solve $2x + 1 = x - 3$, to get

    $2x - x = -3 - 1$

    i.e., $x = -4$

    (i) The representation of the solution on the number line is shown in Figure, where $x = -4$ is treated as an equation in one variable

    (ii) We know that $x = -4$ can be written as $x + 0.y = -4$ which is a linear equation in the variables x and y. This is represented by a line. Now all the values of y are permissible because $0.y$ is always 0. However, x must satisfy the equation $x = -4$. Hence, two solutions of the given equation are $x = -4$, $y = 0$ and $x = -4$, $y = 2$. Note that the graph AB is a line parallel to the y-axis and at a distance of 4 units to the left of it (see Figure).
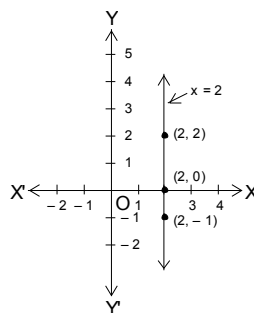
Example 5

    Draw the graph of following :

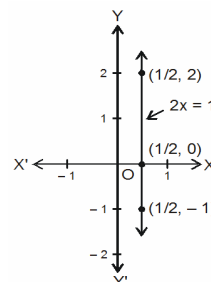   **(i)** $x = 2$ **(ii)** $2x = 1$ **(iii)** $x + 4 = 0$ **(iv)** $x = 0$
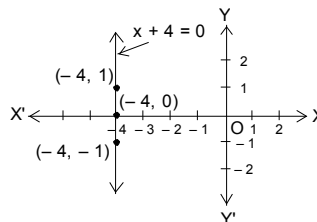
Sol.   **(i)** $x = 2$

               $x + 0.y = 2$

x	2	2	2
y	− 1	0	2

    (ii) $2x = 1$

            $x + 0.y = \dfrac{1}{2}$

x	0.50	0.50	0.50
y	− 1	0	2

(iii) $\quad$ x + 4 = 0

$\quad\quad$ x + 0.y = − 4

x	− 4	− 4	− 4
y	− 1	0	1

(iv) $\quad$ x = 0

$\quad\quad$ x + 0.y = 0

x	0	0	0
y	0	1	2
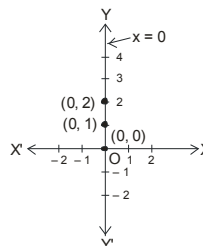
Example 6

Draw the graph of following :

(i) $\quad$ y = 0 $\quad\quad\quad\quad$ **(ii)** $\quad$ y – 2 = 0 $\quad\quad\quad$ **(iii)** $\quad$ 2y + 4 = 0

Sol. $\quad$ **(i)** $\quad$ y = 0

$\quad\quad\quad\quad$ x.0 + y = 0

x	0	1	2
y	0	0	0
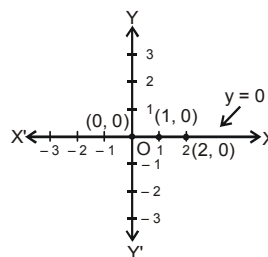
(ii) $\quad$ y – 2 = 0

$\quad\quad\quad$ x.0 + y = 2

x	− 2	− 1	1
y	2	2	2
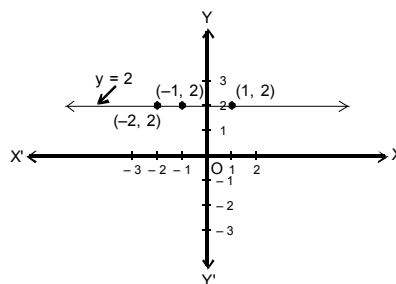
(iii) $\quad$ 2y + 4 = 0

$\quad\quad\quad$ y = − 2

x	0	2	− 2
y	− 2	− 2	− 2
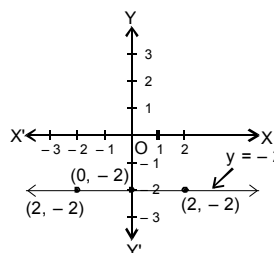
Example 7

Draw the graph of following :

(i) x = y   (ii) x = – y

Sol. (i) x = y

x	1	– 3	0
y	1	– 3	0
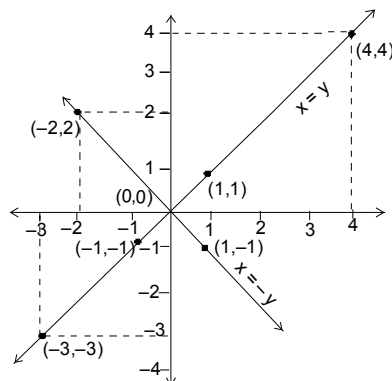
(ii) x = –y

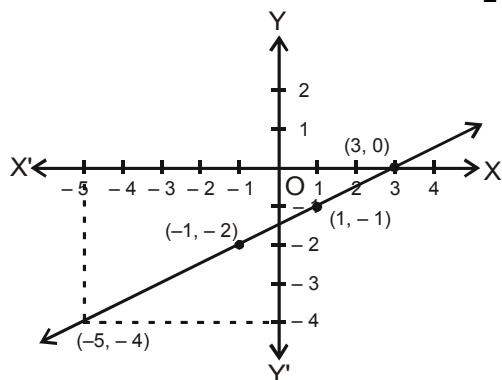| x	1	– 2	0
y	– 1	2	0

Example 8

Draw the graph of the line x – 2y = 3, from the graph find the coordinate of the point when

(i) x = – 5   (ii) y = 0

Sol. Here given equation is x – 2y = 3.

Solving it for y we get $2y = x - 3 \Rightarrow y = \dfrac{x-3}{2}$

Let,   x = –1, then y = $\dfrac{-1-3}{2} = -2$

       x = 1, then y = $\dfrac{1-3}{2} = -1$

       x = 3, then y = $\dfrac{3-3}{2} = 0$

Hence we get

x	– 1	1	3
y	– 2	–1	0

Clearly, when x = – 5 then y = – 4 and when y = 0 then x = 3.

Example 9

Draw the graphs of the lines represented by the equations x + y = 4 and 2x – y = 2 in the same graph. Also, find the coordinate of the point where the two lines intersect.

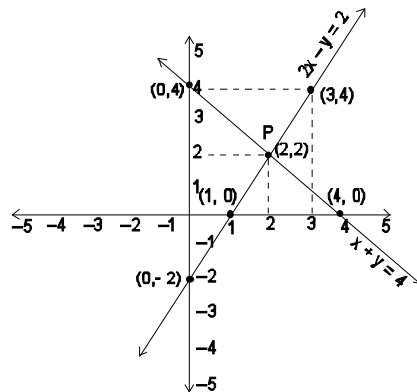**Sol.** Given equations are

x + y = 4 ...(i)

2x – y = 2 ...(ii)

(i) We have y = 4 – x

x	0	2	4
y	4	2	0

(ii) We have y = 2x – 2

x	1	0	3
y	0	– 2	4

By drawing the lines on a graph paper, clearly we can say that P is the point of intersection where coordinates are x = 2, y = 2.
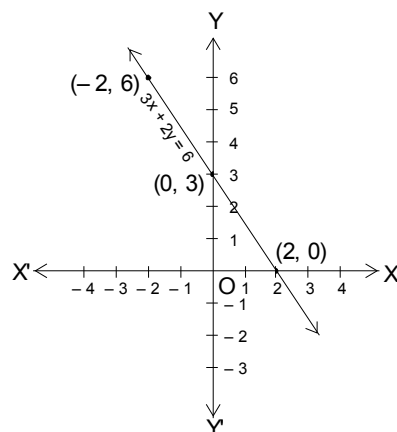

Example 10

Draw the graph of the equation 3x + 2y = 6.Find the co-ordinates of the point where the graph cuts the x - axis and y - axis.

Sol. 3x + 2y = 6

2y = 6 – 3x

$y = \dfrac{6 - 3x}{2}$

x	– 2	0	2
y	6	3	0

Line cuts the x-axis at (2, 0) and y-axis at (0, 3).

Check Your Level

1. Does the line $2x - 5y + 31 = 0$ pass through the point $(-3, 5)$?

2. Does the line $7y + 3x = 0$ pass through the origin?

3. Identify without plotting, the lines parallel to the x or y axis:

    (a) $5x + 3 = 0$ **(b)** $3 - 7y = 0$ **(c)** $10x - 1 = 0$ **(d)** $4x + 9 = 0$

4. Draw the graphs of the following linear equations.

    (a) $5x - 6y + 3 = 0$ **(b)** $x - 6y = 12$ **(c)** $3y + 5x = 9$

    (d) $4x - 5y = 0$ **(e)** $x = 7 + 2y$ **(f)** $3x - y = 0$

    (g) $5x + 6 = 0$ **(h)** $4y - 12 = 0$ **(i)** $x - 7 = 0$

    (j) $y + 4 = 0$

5. Draw the graphs of $3x - 6 = 0$ and $5y + 15 = 0$. Find the coordinates of the point of intersection of the lines from the graphs.

Answers

1. yes   **2.** Yes

3. **(a)** parallel to y-axis   **(b)** parallel to x-axis

    (c) parallel to y- axis   **(d)** parallel to y-axis

4. $x = 2$ and $y = -3$ i.e., $(2, -3)$

Exercise Board Level

TYPE (I) : VERY SHORT ANSWER TYPE QUESTIONS :   **[01 MARK EACH]**

1.   If (2, 0) is a solution of the linear equation $2x + 3y = k$, then find the value of k.

2.   The graph of the linear equation $2x + 3y = 6$ cuts the y-axis at which point ?

3.   Any point on the x-axis is of which form ?

4.   Any point on the line $y = x$ is of which form ?

5.   The equation of x-axis is of which form ?

6.   The graph of the linear equation $2x + 3y = 6$ is a line which meets the x-axis at which point ?

TYPE (II) : SHORT ANSWER TYPE QUESTIONS :   **[02 MARKS EACH]**

7.   At what point does the graph of the linear equation $x + y = 5$ meet a line which is parallel to the y-axis, at a distance 2 units from the origin and in the positive direction of x-axis.

8.   Determine the point on the graph of the equation $2x + 5y = 20$ whose x-coordinate is $\frac{5}{2}$ times its ordinate.

9.   Draw the graph of the equation represented by the straight line which is parallel to the x-axis and is 4 units above it.

10.   Determine the point on the graph of the linear equation $2x + 5y = 19$, whose ordinate is $1\frac{1}{2}$ times its abscissa.

11.   How many solution(s) of the equation $2x + 1 = x - 3$ are there on the :
         (i)   Number line   **(ii)**   Cartesian plane

12.   Find the solution of the linear equation $x + 2y = 8$ which represents a point on
         (i)   x-axis   **(ii)**   y-axis

13.   For what value of c, the linear equation $2x + cy = 8$ has equal values of x and y for its solution.

14.   Show that the points A (1, 2), B (- 1, - 16) and C (0, - 7) lie on the graph of the linear equation $y = 9x - 7$.

TYPE (III) : LONG ANSWER TYPE QUESTIONS: **[03 MARK EACH]**

15.   The Autorikshaw fare in a city is charged Rs 10 for the first kilometer and @ Rs 4 per kilometer for subsequent distance covered. Write the linear equation to express the above statement. Draw the graph of the linear equation.

16.   Draw the graph of the linear equation $3x + 4y = 6$. At what points, the graph cuts the x-axis and the y-axis.

17.   The force exerted to pull a cart is directly proportional to the acceleration produced in the body. Express the statement as a linear equation of two variables and draw the graph of the same by taking the constant mass equal to 6 kg. Read from the graph, the force required when the acceleration produced is (i) 5 m/sec², (ii) 6 rn/sec².

TYPE (IV): VERY LONG ANSWER TYPE QUESTIONS [04 MARK EACH]

18. The linear equation that converts Fahrenheit (F) to Celsius (C) is given by the relation C = $\dfrac{5F - 160}{9}$

   (i) If the temperature is 86°F, what is the temperature in Celsius ?
   (ii) If the temperature is 35°C, what is the temperature in Fahrenheit ?
   (iii) If the temperature is 0°C what is the temperature in Fahrenheit and if the temperature is 0°F, what is the temperature in Celsius?
   (iv) What is the numerical value of the temperature which is same in both the scales ?

19. If the temperature of a liquid can be measured in Kelvin units as x°K or in Fahrenheit units as y°F, the relation between the two systems of measurement of temperature is given by the linear equation

   y = $\dfrac{9}{5}$ (x – 273) + 32

   (i) Find the temperature of the liquid in Fahrenheit if the temperature of the liquid is 313°K.
   (ii) If the temperature is 158° F, then find the temperature in Kelvin.

Exercise-1

SUBJECTIVE QUESTIONS

Subjective Easy, only learning value problems

Section (A) : Introduction to equation

A-1. Determine whether x = 5, y = 4 is a solution of the equation x – 2y = – 3.

A-2. Find the value of k if (3,4) is a solution of the equation 5x-2y=k. Find one more solution of the equation.

A-3. If the point (– 3, 4) lies on the linear equation ay = 5x + 11, then find the value of a.

A-4. If p = 3x + 1, q = $\dfrac{1}{3}$ (9x + 13) and p : q = 6 : 5 then find x

A-5. I am three times as old as my son. Five years later, I shall be two and half times as old as my son. Taking my age as x year and son's age as y year, write the linear equation so formed

A-6. If $\dfrac{2x + 7}{x + 2} = \dfrac{4x + 3}{2x - 7}$, find the value of x³ + x² + x + 1.

A-7. The following linear equation converts Fahrenheit to Celsius, F = $\dfrac{9}{5}C + 32$

   (i) If the temperature is 30º C, what is the temperature in Fahrenheit .
   (ii) If the temperature is 95º F, what is the temperature in Celsius.
   (iii) Find the temperature which is numerically same in both the scales of temperature.

A-8. A man hires an auto rickshaw to cover a certain distance. The fare is Rs. 10 for first kilometer and Rs 7 for subsequent kilometers. Taking total distance covered as x km and total fare as Rs y,
   (i) Write a linear equation for this.
   (ii) The man covers a distance of 16 km and gave Rs 120 to the auto driver. Auto driver said, "It is not the correct amount" and returned him the balance. Find the correct amount paid back by the auto driver.

Section (B) : Methods of solving Linear Equation in two variables

B-1. Draw the graph of the equation, 2x + 3y = 6. Find the length of intercept on both co-ordinate axes.

B-2. Write the equations of line parallel to x - axis at a distance of 3 unit.

B-3. Express y in terms of x, given that 2y-4x=7. Check whether (-1,-1) is a solution of the line ?

B-4. Saloni goes to market with Rs. 100 and buys 2 kg of apples at the rate of Rs. x per kg and 5 kg of potatoes at the rate of Rs. y per kg and has no money left. Write an equation for this statement and draw the graph.

B-5. Draw a triangle whose sides are represented by x = 0, y = 0 and x + y = 3 in the cartesian system. Also, find the coordinates of its vertices.

B-6. Draw the graph of the lines 4x – y = 5 and 5y – 4x = 7 on the same graph paper and find the coordinates of their point of intersection.

B-7. The taxi fare in a city as follows : For the first kilometer, the fare is Rs. 8 and for the subsequent distance it is Rs. 5 per km. Taking the distance covered as x km and total fare is Rs. y, write a linear equation for this information, and draw the graph.

B-8. The points (2,3) lies on the graph of the linear equation 3x-(a-1)y=2a-1. If the same point also lies on the graph of the linear equation 5x+(1-2a)y=3b, then find the value of b.

OBJECTIVE QUESTIONS

Single Choice Objective, straight concept/formula oriented

Section (A) : Introduction to equation

A-1. Which of the following equations is not linear equation :

(A) 2x + 3 = 7x – 2   (B) $\frac{2}{3}$ x + 5 = 3x – 4   (C) x^2 + 3 = 5x – 3   (D) $(x – 2)^2 = x^2 + 8$

A-2. Solution of equation $\sqrt{3}x - 2 = 2\sqrt{3} + 4$ is :

(A) $2(\sqrt{3} – 1)$ (B) $2(1 – \sqrt{3})$ (C) $1 + \sqrt{3}$ (D) $2(1 + \sqrt{3})$

A-3. The value of x which satisfy $\frac{6x+5}{4x+7} = \frac{3x+5}{2x+6}$ is :

(A) –1   (B) 1   (C) 2   (D) –2

A-4. One fourth of one third of one half of a number is 12, then number is :
(A) 284   (B) 286   (C) 288   (D) 290

A-5. A linear equation in two variables has maximum :
(A) only one solution   (B) two solution   (C) infinite solution   (D) None of these

A-6. Solution of the equation x – 2y = 2 is/are :
(A) x = 4, y = 1   (B) x = 2, y = 0   (C) x = 6, y = 2   (D) All of these

A-7. If x = 1, y = 1 is a solution of equation 9ax + 12ay = 63 then, the value of a is :
(A) – 3   (B) 3   (C) 7   (D) 5

A-8. An ordered pair that satisfies an equation in two variables is called its :
(A) Zero   (B) Root   (C) Solution   (D) Both (B) and (C)

Section (B) : Methods of solving Linear Equation in two variables

B-1. The graph of line $5x + 3y = 4$ cuts Y-axis at the point :

(A) $\left(0, \dfrac{4}{3}\right)$ (B) $\left(0, \dfrac{3}{4}\right)$ (C) $\left(\dfrac{4}{5}, 0\right)$ (D) $\left(\dfrac{5}{4}, 0\right)$

B-2. Equation representing the given graph is :
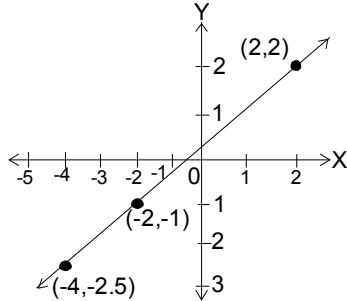
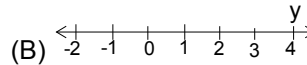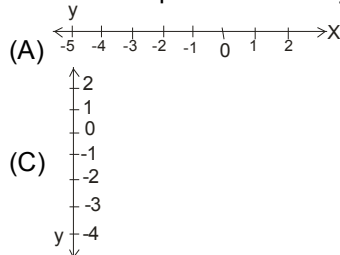(A) $3x - 7y = 10$ (B) $y - 2x = 3$ (C) $8y - 6x = 4$ (D) $5x + \dfrac{35}{2}y = 25$

B-3. Which equation is another form of $-x + 6y = 12$?

(A) $y = -\dfrac{1}{6}x + 2$ (B) $x = 6y + 12$ (C) $x = 6y - 12$ (D) $6y = 12 - x$

B-4. Which is an equation of the line with the coefficient of x is $\dfrac{2}{3}$ and that passes through the point $(4, -1)$?
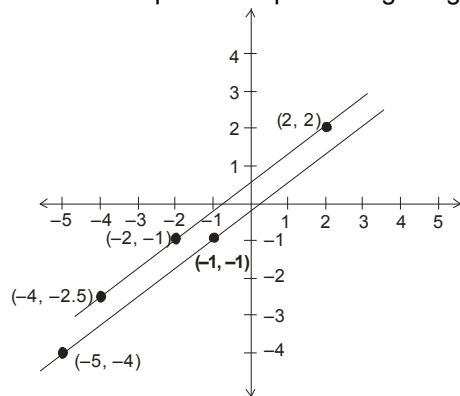
(A) $y = -\dfrac{1}{4}x + \dfrac{2}{3}$ (B) $y = -4x + \dfrac{2}{3}$ (C) $y = \dfrac{2}{3}x - \dfrac{5}{3}$ (D) $y = \dfrac{2}{3}x - \dfrac{11}{3}$

B-5. Geometric representation of $y = 4$ as an equation in one variable is :

(A)   (B)

(C)   (D) Both (A) and (B) are correct

B-6. The set of equations representing the given graph is :

(A) $2x + 7y = 11$; $5x + \dfrac{35y}{2} = 25$ (B) $3x - 4y = 1$; $8y - 6x = 4$

(C) $7x + 2y = 11$; $y - 2x = 3$ (D) $3x - 7y = 10$; $8y - 6x = 4$

B-7. Which of the following statement is correct :
(A) x = 0 represents the equation of y axis
(B) y = 2 represents a line parallel to x axis
(C) (2,–3) is the solution of linear equation 2x + 4y = – 8
(D) All of these

Exercise-2

OBJECTIVE QUESTIONS

1. If one-fourth of the sum of a number and seven is four less than three times the number, then the number is

(A) $\dfrac{23}{11}$ (B) $\dfrac{11}{23}$ (C) $\dfrac{22}{46}$ (D) $\dfrac{46}{22}$

2. If $\dfrac{3x+6}{8} - \dfrac{11x-8}{24} + \dfrac{x}{3} = \dfrac{3x}{4} - \dfrac{x+7}{24}$, then the value of x is
(A) x = 1   (B) x = 2   (C) x = 3   (D) x = 4

3. The parking charges of a car at certain place in Delhi is Rs.50 for first one hour and Rs. 10 for subsequent hours. Write down the equation and draw the graph for the data.Find the charges from the graph for 8 hours.
(A) y = 10x – 40, Rs. 120   (B) y = 10x + 40, Rs. 120
(C) y = 40x + 10, Rs. 120   (D) y = – 10x + 40, Rs. 120

4. At what point does the graph of the linear equation 2x+3y=9 meet a line which is parallel to the y-axis, at a distance of 4 units from the origin and on the right of the y-axis is

(A) $\left(4, \dfrac{1}{3}\right)$ (B) $\left(-4, \dfrac{3}{1}\right)$ (C) $\left(4, -\dfrac{3}{1}\right)$ (D) None of these

5. If the point (-1,-5) lies on the graphs of 3x = ay + 7 and y = bx + 7, then the value of a + b is
(A) 10   (B) 11   (C) 12   (D) 14

Exercise-3

NTSE PROBLEMS (PREVIOUS YEARS)

1. If $\dfrac{15}{x} + \dfrac{2}{y} = 17$ and x = 3, then value of y is :   **[Raj. NTSE Stage-1 2006]**

(A) $\dfrac{1}{6}$ (B) $\dfrac{1}{5}$ (C) $-\dfrac{1}{6}$ (D) $-\dfrac{1}{5}$

2. If 5x – 2y = k one of answer is (2, – 2), then k = ...   **[Gujarat NTSE Stage-1 2013]**
(A) – 40   (B) 6   (C) 14   (D) 10

3. Age of Ramesh is x. Ramesh is 5 years older than Mahesh, but 3 years younger than suresh, then suresh's age is ....years.   **[Gujarat NTSE Stage-1 2013]**
(A) x + 3   (B) x + 5   (C) x – 5   (D) 8 – x

4. Solve equation : $\dfrac{2x}{5} + 1 = \dfrac{x}{3} + 3$, then x = ... **[Gujarat NTSE Stage-1 2013]**

   (A) 10   (B) 40   (C) 30   (D) 15

5. A farmer divides his herd of x cows among his 4 son's such that first son gets one-half of the herd, the second son gets one fourth, the third son gets one-fifth and the fourth son gets 7 cows, then the value of x is : **[M.P. NTSE Stage-1 2013]**

   (A) 100   (B) 140   (C) 160   (D) 180

6. In three given numbers. the second number is twice than the first number and thrice than the third number. If the average of the three numbers. is 44, what is the largest number ? **[Gujarat NTSE Stage-1 2014]**

   (A) 24   (B) 72   (C) 36   (D) 8

7. If $\dfrac{x}{3} + 7 = 15 - \dfrac{x}{5}$, then find the solution ? **[Gujarat NTSE Stage-1 2015]**

   (A) x = 20   (B) x = 15   (C) x = 21   (D) x = 18

8. Mother was at the age of 30 when the son was born. What is the age of the son? **[Gujarat NTSE Stage-1 2015]**

   (A) 5 Years   (B) 10 Years   (C) 15 Years   (D) 20 Years

9. Line x + y = 2 passes through the _____ quadrants. **[Gujarat NTSE Stage-1 2016]**
   (A) 1st and 3rd both   (B) 2nd and 3rd both   (C) 3rd and 4th both   (D) 1st, 2nd, 4th

10. 3 year ago the sum of ages of father and his son was 40 years. After 2 years , the sum of ages of the father and his son will be: **[Gujarat NTSE Stage-1 2016]**
    (A) 40   (B) 46   (C) 50   (D) 60

11. A father is 7 times as old as his son. Two years ago, the father was 13 times as old as his son. Father's present age is **[U.P. NTSE Stage-1 2017]**
    (A) 24 years   (B) 28 years   (C) 30 years   (D) 32 years

Answer Key

Exercise Board Level

TYPE (I)

1. 4   **2.** (0, 2)   **3.** (x, 0)   **4.** (a, a)   **5.** y = 0

6. (3, 0)

TYPE (II)

7. (2, 3)   **8.** (5, 2)   **10.** (2, 3)   **11.** **(i)** 1   **(ii)** Infinite

12. **(i)** (8, 0) **(ii)** (0, 4)   **13.** $c = \dfrac{8 - 2x}{x}$, $x \neq 0$

TYPE (III)

15. y = 4x + 6   **16.** $\left(0, \dfrac{3}{2}\right)$, (2, 0) **17.** **(i)** 30 N **(ii)** 36 N

TYPE (IV):

18. **(i)** **30°C**   **(ii)** **95° F**   **(iii)** $\left(-\dfrac{160}{9}\right)^{\circ}$ C   **(iv)** -40

19. **(i)** 104° F   **(ii)** 343 K

Exercise-1

Section (A)

A-1. Yes   **A-2.** k = 7   **A-3.** a = – 1.   **A-4.** x = – 7.

A-5. 2x – 5y = 15   **A-6.** –104.

A-7. **(i)** 86° F.   **(ii)** 35° C.   **(iii)** – 40

A-8. **(i)** 7x + 3 = y   **(ii)** Balance = Rs. 5

Section (B)

B-1. 3 unit, 2 unit   **B-2.** y = 3 or y = – 3.   **B-3.** Not a solution

B-4. 2x + 5y = 100.   **B-5.** (0, 0), (0, 3), (3, 0)   **B-6.** (2, 3)   **B-7.** y = 5x + 3.

B-8. $b = \dfrac{1}{3}$

OBJECTIVE QUESTIONS

Section (A)

A-1.	(C)	**A-2.**	(D)	**A-3.**	(B)	**A-4.**	(C)	**A-5.**	(C)
A-6.	(D)	**A-7.**	(B)	**A-8.**	(D)				

Section (B)

B-1.	(A)	**B-2.**	(C)	**B-3.**	(C)	**B-4.**	(D)	**B-5.**	(B)
B-6.	(B)	**B-7.**	(D)							

Exercise-2

OBJECTIVE QUESTIONS

Ques.	1	2	3	4	5
Ans.	A	C	B	A	D

Exercise-3

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	A	C	A	C	B	B	B	C	D	C	B