Success Key Worksheet

Std: Class 10 (Eng.& Semi) | **Ch.1 Linear Equ.in Two Variable (Worksheet 1)** | **Time:1 Hr.**

Date: | **Subject: Mathematics-1** | **Max Marks: 20**

Q.1) Choose the correct alternative and write its alphabet with sub questions number. **3**

1) Arranging equation x + 5 = –14y in standard form ax + by + c = 0 we get b = _____.
   (a) 14 (b) –14 (c) 5 (d) 1

2) When a linear equation is written in the form Ax + By + C = 0, A and B cannot both be
   (a) fractions (b) one (c) integers (d) zero

3) One equation of a pair of dependent linear equations is –5x + 7y = 2. The second can be
   (a) 10x + 14y + 4 = 0 (b) –10x – 14y + 4 = 0
   (c) –10x + 14y + 4 = 0 (d) 10x – 14y = –4

Q.2) Solve the following sub-question: **3**

1) Solve the following simultaneous equations using graphical method:
   x + 2y = 5; y = -2x -2

2) Solve the following simultaneous equations using graphical method:
   4x = y - 5; y = 2x +1

3) Find the value of the following determinant.

$$B = \begin{vmatrix} 2\sqrt{3} & 9 \\ 2 & 3\sqrt{3} \end{vmatrix}$$

Q.3) Complete the following activities and rewrite it. (Any 1) **2**

1) Complete the following table to draw the graph of 2x – 6y = 3

Given equation is $2x - 6y = 3$
Place $x = -5$
$2(-5) - 6y = 3$
$\square - 6y = 3$
$-6y = 3 + 10$
$-6y = \square$

$$y = \frac{13}{(-6)}$$

$$y = -\frac{13}{6}$$

Coordinates are $(x, y) = (-5, -\square)$

Place $y = 0$
$2x - \square = 3$
$2x - 0 = 3$
$2x = 3$

$$x = \frac{3}{2}$$

Coordinates are $(x, y) = (\frac{3}{2}, 0)$

2) Find the value of the following determinant.

$$\begin{vmatrix} -1 & 7 \\ 2 & 4 \end{vmatrix}$$

$= (-1) \times 4 - \square$

$= -4 - \square$

$= \square$

$\therefore \begin{vmatrix} -1 & 7 \\ 2 & 4 \end{vmatrix} = \square$

Q.4) Solve the following sub-question: (Any 1) **2**

1) Find the value of the following determinant.

$$\begin{vmatrix} \frac{7}{3} & \frac{5}{3} \\ \frac{3}{2} & \frac{1}{2} \end{vmatrix}$$

2) Find the value of the following determinant.

$$\begin{vmatrix} 5 & 3 \\ -7 & 0 \end{vmatrix}$$

Q.5) Complete the following activities and rewrite it. **3**

1) The sum of father's age and twice the age of his son is 70. If we double the age of the father and add it to the age of his son the sum is 95. Find their present ages.

Assume that the present ages of father and his son are 'x' years and 'y' years respectively.

From condition (I): The sum of father's age and twice the age of his son is 70

$x + 2y = 70$ ... (I)

From condition (II): If we double the age of the father and add it to the age of his son the sum is 95.

$2x + y = 95$ ... (II)

Solving equation (I) and (II) as Multiplying (II) by 2 and then subtracting (I) and (II), we get

$x + 2y = 70; 4x + 2y = 190$

Subtracting,

$$\begin{array}{rcrcr} x & + & 2y & = & 70 \\ 4x & + & 2y & = & 190 \\ - & & - & & - \\ \hline -\ 3x & & & = & \square \end{array}$$

$x = \frac{\square}{(-3)}$

$x = \square$

Place $x = 40$ in equation (I) to obtain 'y'

$40 + 2y = 70$

$2y = 70 - 40$

$2y = 30$

$y = \square$

$y = \square$

Thus, present age of father is 40 years and that of son is $\square$

Q.6) Solve the following sub-question: (Any 1) **3**

1) Draw graph of $2x - y = 4$.

2) Solve the following simultaneous equation using Cramer's rule.
$3x - 4y = 10$; $4x + 3y = 5$

Q.7) Solve the following sub-question: (Challenging que.) (Any 1) **4**

1) Solve the following simultaneous equations using graphical method:
$x + 2y = 5$; $y = -2x - 2$

2) Solve the following simultaneous equations using graphical method:
$4x = y - 5$; $y = 2x + 1$

3) Find the value of the following determinant.

$$B = \begin{vmatrix} 2\sqrt{3} & 9 \\ 2 & 3\sqrt{3} \end{vmatrix}$$

Success Key Worksheet

Std: Class 10 (Eng.& Semi) | **Ch.1 Linear Equ.in Two Variable (W1-Answer key)** | **Time: 1 Hr.**

Date: | **Subject: Mathematics-1** | **Max Marks: 20**

Q.1) Choose the correct alternative and write its alphabet with sub questions number. **3**

1)Ans. (a) 14

Arranging equation $x + 5 = -14y$ in standard form $ax + by + c = 0$

$x + 14y + 5 = 0$

$a = 1; b = 14; c = 5$

Thus, $b = 14$

2)Ans. (d)

$ax + by + c = 0$ is the general linear equation of two variable; a,b,c are real number and a,b, are not equal to zero.

3)Ans. (d)

Dependent linear equations means consistent and the equations have infinitely many solutions.

In this case

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

Q.2) Solve the following sub-question: **3**

1)Ans.

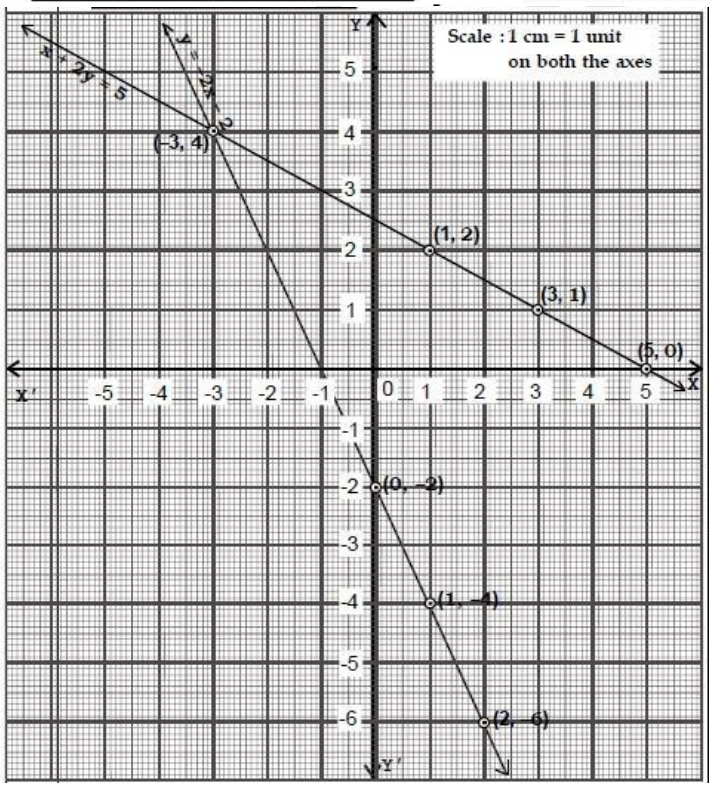
$x + 2y = 5$

$\therefore\ x = 5 - 2y$

x	5	3	1
y	0	1	2
(x, y)	(5, 0)	(3, 1)	(1, 2)

$y = -2x - 2$

x	0	1	2
y	–2	–4	–6
(x, y)	(0, –2)	(1, –4)	(2, –6)



2)Ans.

$4x = y - 5$

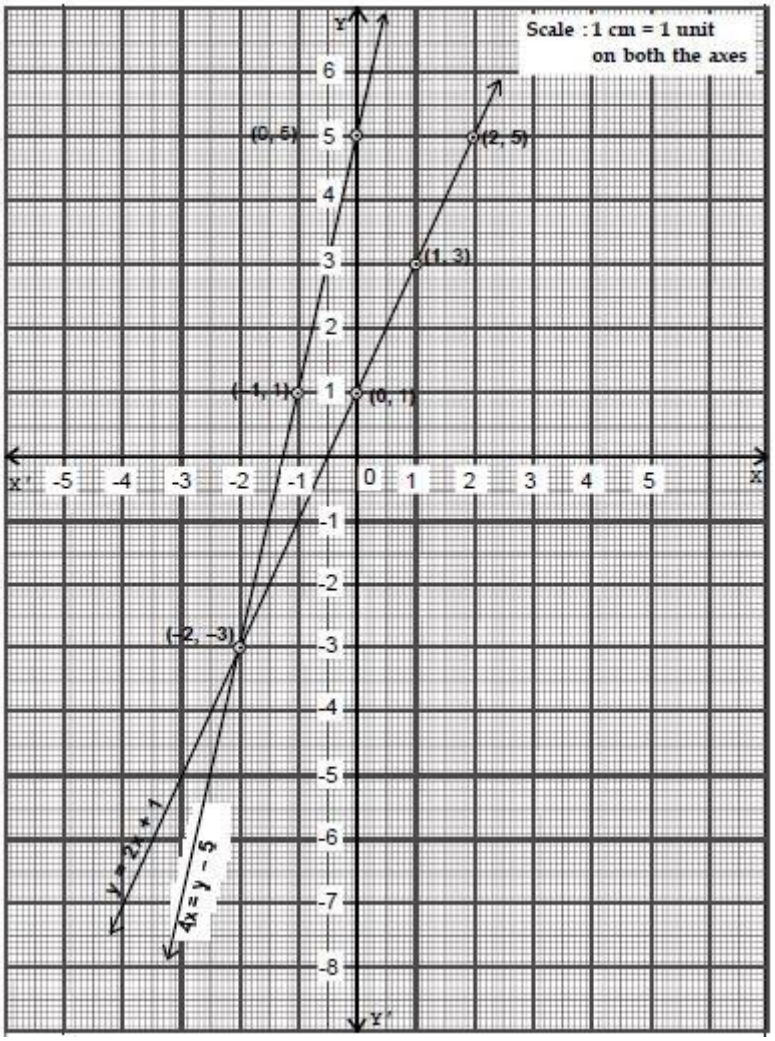
$\therefore\ 4x + 5 = y$

$\therefore\ y = 4x + 5$

x	0	–1	–2
y	5	1	–3
(x, y)	(0, 5)	(–1, 1)	(–2, –3)

$y = 2x + 1$

x	0	1	2
y	1	3	5
(x, y)	(0, 1)	(1, 3)	(2, 5)



3)Ans. 0

$$B = \begin{vmatrix} 2\sqrt{3} & 9 \\ 2 & 3\sqrt{3} \end{vmatrix} = [2\sqrt{3} \times 3\sqrt{3})] - [2 \times 9)] = 18 - 18 = 0$$

Q.3) Complete the following activities and rewrite it. (Any 1) **2**

1)Ans.

Given equation is $2x - 6y = 3$

Place $x = -5$

$2(-5) - 6y = 3$

$-10 - 6y = 3$

$-6y = 3 + 10$

$-6y = 13$

$y = \frac{13}{(-6)}$

$y = -\frac{13}{6}$

Coordinates are $(x, y) = (-5, -\frac{13}{6})$

Place $y = 0$

$2x - 6(0) = 3$

$2x - 0 = 3$

$2x = 3$

$x = \frac{3}{2}$

Coordinates are $(x, y) = (\frac{3}{2}, 0)$

2)Ans. $\begin{vmatrix} -1 & 7 \\ 2 & 4 \end{vmatrix}$

$= (-1) \times 4 - 7 \times 2$

$= -4 - 14$

$= -18$

$\therefore \begin{vmatrix} -1 & 7 \\ 2 & 4 \end{vmatrix} = -18$

Q.4) Solve the following sub-question: (Any 1) **2**

1)Ans. $\begin{vmatrix} \frac{7}{3} & \frac{5}{3} \\ \frac{3}{2} & \frac{1}{2} \end{vmatrix}$

$= \frac{7}{3} \times \frac{1}{2} - \frac{5}{3} \times \frac{3}{2}$

$= \frac{7}{6} - \frac{15}{6}$

$= \frac{7 - 15}{6}$

$= -\frac{8}{6}$

$= -\frac{4}{3}$

$\therefore \begin{vmatrix} \frac{7}{3} & \frac{5}{3} \\ \frac{3}{2} & \frac{1}{2} \end{vmatrix} = -\frac{4}{3}$

2)Ans.

$$\begin{vmatrix} 5 & 3 \\ -7 & 0 \end{vmatrix}$$

$= 5\times 0 - 3\times(-7)$

$= 0 + 21$

$= 21$

$\therefore \begin{vmatrix} 5 & 3 \\ -7 & 0 \end{vmatrix} = 21$

Q.5) Complete the following activities and rewrite it. **3**

1)Ans. Assume that the present ages of father and his son are 'x' years and 'y' years respectively.

From condition (I): The sum of father's age and twice the age of his son is 70

$x + 2y = 70$ ... (I)

From condition (II): If we double the age of the father and add it to the age of his son the sum is 95.

$2x + y = 95$ ... (II)

Solving equation (I) and (II) as Multiplying (II) by 2 and then subtracting (I) and (II), we get

$x + 2y = 70;\ 4x + 2y = 190$

Subtracting,

$$\begin{array}{rcrcr} x & + & 2y & = & 70 \\ 4x & + & 2y & = & 190 \\ - & & - & & - \\ \hline -\ 3x & & & = & \boxed{-\ 120} \end{array}$$

$x = \dfrac{\boxed{(-120)}}{(-3)}$

$x = \boxed{40}$

Place $x = 40$ in equation (I) to obtain 'y'

$40 + 2y = 70$

$2y = 70 - 40$

$2y = 30$

$y = \dfrac{\boxed{30}}{2}$

$y = \boxed{15}$

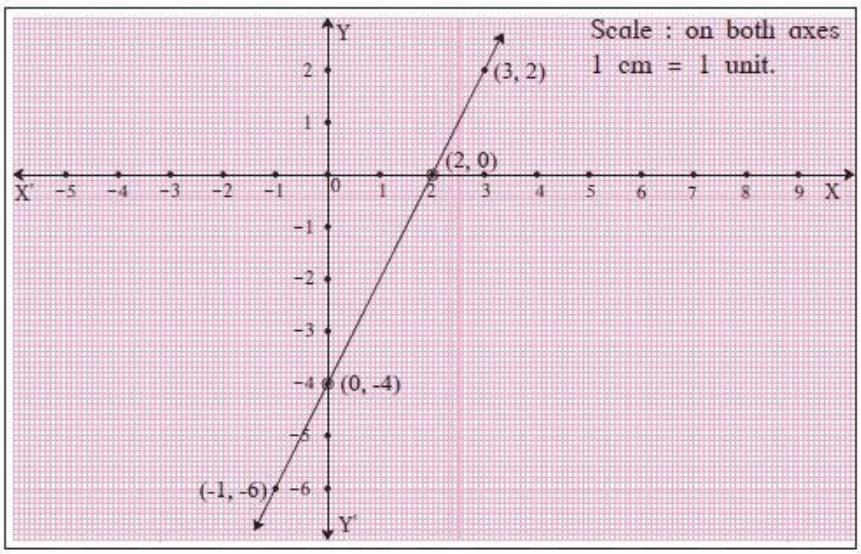
Thus, present age of father is 40 years and that of son is $\boxed{15 \text{ years}}$

Q.6) Solve the following sub-question: (Any 1) **3**

1)Ans. To draw a graph of the equation let's write 4 ordered pairs.

x	0	2	3	−1
y	−4	0	2	−6
(x, y)	(0, −4)	(2, 0)	(3, 2)	(−1, −6)

To obtain ordered pair by simple way let's take $x = 0$ and then $y = 0$.



2)Ans. Given equations are

$3x - 4y = 10$

$4x + 3y = 5$

$$D = \begin{vmatrix} 3 & -4 \\ 4 & 3 \end{vmatrix} \qquad D_x = \begin{vmatrix} 10 & -4 \\ 5 & 3 \end{vmatrix} \qquad D_y = \begin{vmatrix} 3 & 10 \\ 4 & 5 \end{vmatrix}$$

$= 3(3) - 4(-4)$ $= 10(3) - 5(-4)$ $= 3(5) - 4(10)$

$= 9 + 16$ $= 30 + 20$ $= 15 - 40$

$= 25$ $= 50$ $= -25$

Thus,

$$x = \frac{D_x}{D} \qquad y = \frac{D_y}{D}$$

$$= \frac{50}{25} \quad \text{and} \quad = \frac{-25}{25}$$

$= 2$ $= -1$

Therefore, (x, y) = (2, –1) is the solution.

Q.7) Solve the following sub-question: (Challenging que.) (Any 1) **4**

1)Ans.

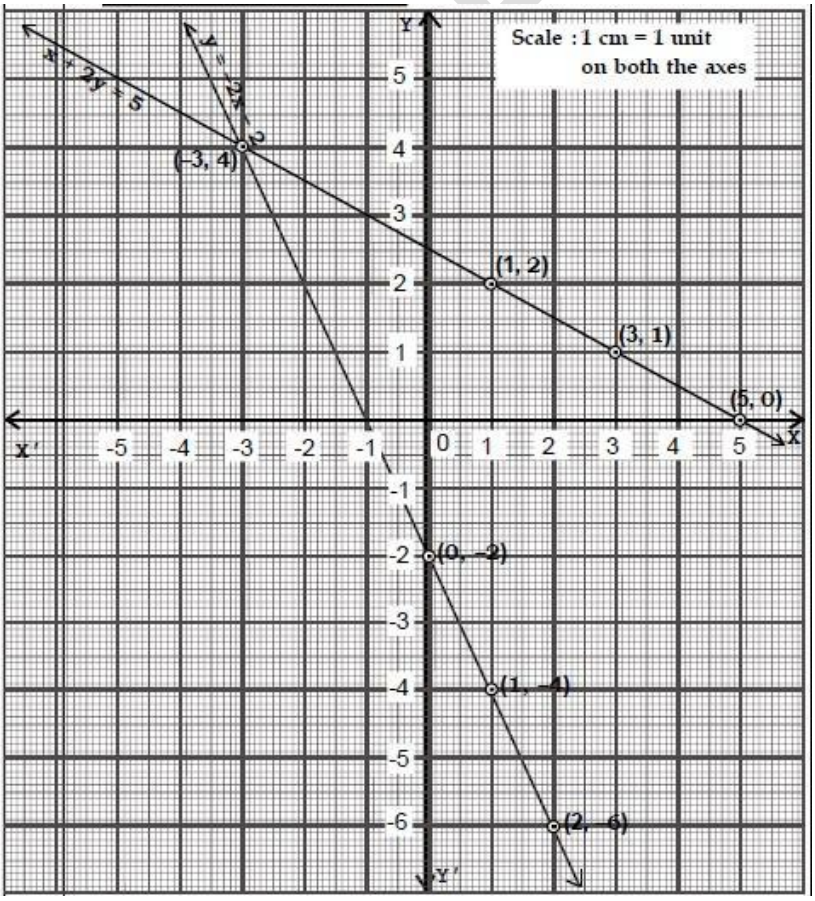
$x + 2y = 5$

$\therefore\ x = 5 - 2y$

x	5	3	1
y	0	1	2
(x, y)	(5, 0)	(3, 1)	(1, 2)

$y = -2x - 2$

x	0	1	2
y	–2	–4	–6
(x, y)	(0, –2)	(1, –4)	(2, –6)



2)Ans.

$4x = y - 5$

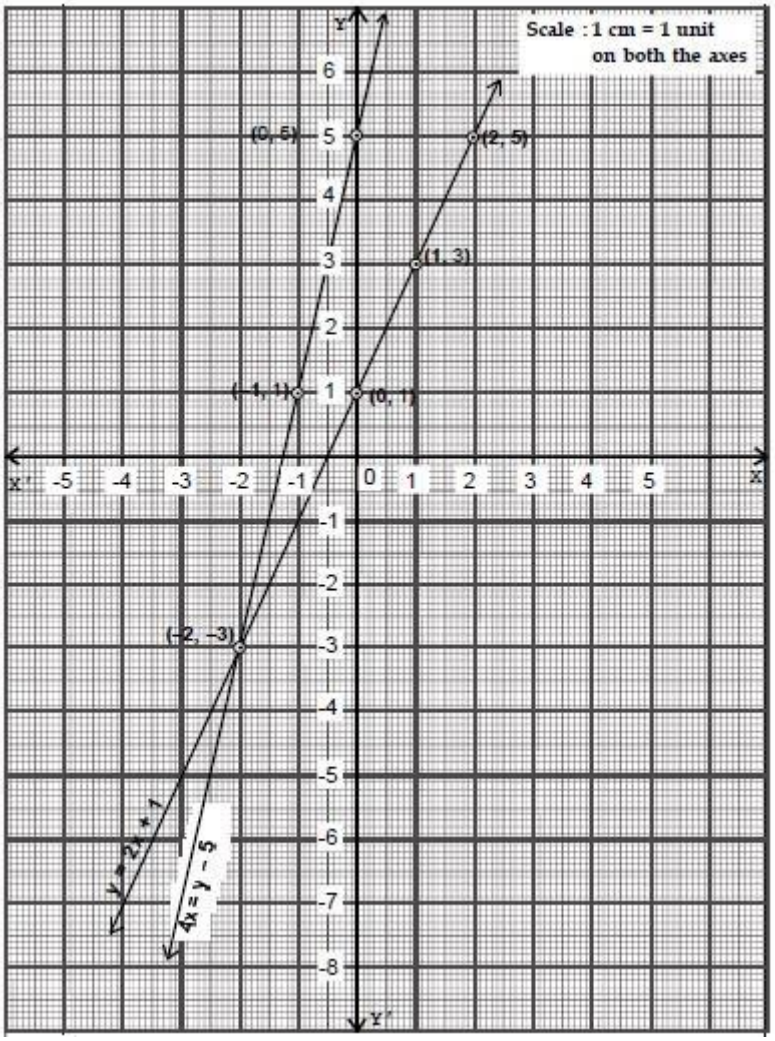
$\therefore\ 4x + 5 = y$

$\therefore\ y = 4x + 5$

x	0	–1	–2
y	5	1	–3
(x, y)	(0, 5)	(–1, 1)	(–2, –3)

$y = 2x + 1$

x	0	1	2
y	1	3	5
(x, y)	(0, 1)	(1, 3)	(2, 5)



3)Ans. 0

$$B = \begin{vmatrix} 2\sqrt{3} & 9 \\ 2 & 3\sqrt{3} \end{vmatrix} = [2\sqrt{3} \times 3\sqrt{3})] - [2 \times 9)] = 18 - 18 = 0$$

Success Key Worksheet

Std: Class 10 (Eng.& Semi) | **Ch. 1 Linear Equ.in Two Variable (Worksheet 2)** | **Time:1 Hr.**

Date: | **Subject: Mathematics-1** | **Max Marks: 20**

Q.1) Choose the correct alternative and write its alphabet with sub questions number. **3**

1) Which of the following is not a linear equation in two variable?
   (a) $10x + 4y = 3$ (b) $-x + 5y = 2$
   (c) $2x^2 - 8x + 7 = 0$ (d) $5x + 3y = 30$

2) The value of k for which the pair of linear equations $4x + 6y - 1 = 0$ and $2x + ky - 7 = 0$ represents parallel lines is :
   (a) $k = 3$ (b) $k = 2$ (c) $k = 4$ (d) $k = -2$

3) Which of the following is not a solution of the pair of equations $3x - 2y = 4$ and $6x - 4y = 8$?
   (a) $x = 2, y = 1$ (b) $x = 4, y = 4$ (c) $x = 6, y = 7$ (d) $x = 5, y = 3$

Q.2) Solve the following sub-question: **3**

1) Write any two solutions of the equation $a - b = -3$.

2) Decide whether (0, 2) is the solution of the equation $5x + 3y = 6$.

3) Write any two solutions of the equation $x + y = 7$.

Q.3) Complete the following activities and rewrite it. (Any 1) **2**

1) Find the value of the following determinant.

$$N = \begin{vmatrix} -8 & -3 \\ 2 & 4 \end{vmatrix} = [\square \times (4)] - [\square \times 2)] = -32 - \square$$

$$= -32 + 6 = \square$$

2) Fill in the blanks with correct number

$$\begin{vmatrix} 3 & 2 \\ 4 & 5 \end{vmatrix} = 3 \times \square - \square \times 4 = \square - 8 = \square$$

Q.4) Solve the following sub-question: (Any 1) **2**

1) Find the value of the following determinants.

$$\begin{vmatrix} 4 & 3 \\ 2 & 7 \end{vmatrix}$$

$$\begin{vmatrix} 5 & -2 \\ -3 & 1 \end{vmatrix}$$

2) Solve the following simultaneous equations.
   $x + 7y = 10; 3x - 2y = 7$

Q.5) Complete the following activities and rewrite it. **3**

1) Solve the following simultaneous equation using Cramer's rule.
4x + 3y - 4 = 0; 6x = 8 - 5y

Given equations are

$4x+3y-4=0$

$6x=8-5y$

Or

$4x+3y=4$

$6x+5y=8$

$D=\begin{vmatrix}4 & 3\\ 6 & 5\end{vmatrix}$

$=4(5)-3(6)$

$=\square-18$

$=\square$

$D_x=\begin{vmatrix}4 & 3\\ 8 & 5\end{vmatrix}$

$=4(5)-3(8)$

$=20-24$

$=-4$

$D_y=\begin{vmatrix}4 & 4\\ 6 & 8\end{vmatrix}$

$=4(8)-6(4)$

$=32-\square$

$=\square$

Thus,

$x=\frac{D_x}{D}$

$=\square$

$=-2$

and

$y=\frac{D_y}{D}$

$=\square$

$=4$

Q.6) Solve the following sub-question: (Any 1) **3**

1) Solve the following simultaneous equation using Cramer's rule.
x + 2y = -1; 2x - 3y = 12

2) Solve the following simultaneous equation using Cramer's Rule.
5x + 3y = -11 ; 2x + 4y = -10

Q.7) Solve the following sub-question: (Challenging que.) (Any 1) **4**

1) The sum of a two digit number and the number obtained by reversing its digits is 121. Find the number if its units place digit is greater than the tens place digit by 7.

2) Solve the following equations by Cramer's method. 4m - 2n = -4 ; 4m + 3n = 16

Success Key Worksheet

Std: Class 10 (Eng.& Semi) | **Ch. 1 Linear Equ.in Two Variable (Worksheet 2)** | **Time:1 Hr.**

Date: | **Subject: Mathematics-1** | **Max Marks: 20**

Q.1) Choose the correct alternative and write its alphabet with sub questions number. **3**

1)Ans. (d)

ax + by + c =0 is the general linear equation of two variable; a,b,c are real number and a,b, are not equal to zero.

So, $2x^2 – 8x + 7 = 0$ is not linear equation.

2)Ans. (a)

For parallel lines (no solution), $a_1/a_2 = b_1/b_2 \neq c_1/c_2$

$4/2 = 6/k$

$k = 3$

3)Ans. (d)

As the value of x= 5 and y=3 does not satisfies any of the given equation, hence (5,3) is not a solution of the pair of equations $3x-2y=4$ and $6x-4y=8$.

Q.2) Solve the following sub-question: **3**

1)Ans. When b = 1, a = –3 + 1 = –2

When b = 4, a = –3 + 4 = 1

(–2, 1) and (1, 4) are the solutions of a – b = –3.

2)Ans. L.H.S. = 5x + 3y

= 5(0) + 3(2)

= 0 + 6

= 6 = R.H.S.

(0, 2) is the solution of the given equation.

3)Ans. When x = 1, y = 7 – 1 = 6

When x = 3, y = 7 – 3 = 4

(1, 6) and (3, 4) are the solutions of x + y = 7

Q.3) Complete the following activities and rewrite it. (Any 1) **2**

1)Ans. $N = \begin{vmatrix} -8 & -3 \\ 2 & 4 \end{vmatrix} = [\boxed{-8} \times (4)] - [\boxed{-3} \times 2)] = -32 - \boxed{(-6)}$

$= -32 + 6 = \boxed{-26}$

2)Ans. $\begin{vmatrix} 3 & 2 \\ 4 & 5 \end{vmatrix} = 3 \times \boxed{5} - \boxed{2} \times 4 = \boxed{15} - 8 = \boxed{7}$

Q.4) Solve the following sub-question: (Any 1) **2**

1)Ans.

$$\begin{vmatrix} 4 & 3 \\ 2 & 7 \end{vmatrix}$$

$= 4(7) - 2(3)$

$= 28 - 6$

$= 22$

$$\begin{vmatrix} 5 & -2 \\ -3 & 1 \end{vmatrix}$$

$= 5(1) - (-3)(-2)$

$= 5 - 6$

$= -1$

2)Ans. Here the equations are

$x + 7y = 10$ ... (I)

$3x - 2y = 7$ ... (II)

Both the variables are having different coefficients, first make the coefficient same. Multiply equation (I) by '3' as

$3x + 21y = 30$ ... (III)

As the sign of '3x' in the equations (II) and (III) is same, proceed as subtracting equation (II) and (III)

$$\begin{array}{rcrcr} 3x & + & 21y & = & 30 \\ 3x & - & 2y & = & 7 \\ - & + & & = & - \\ \hline & & 23y & = & 23 \end{array}$$

$$y = \frac{23}{23}$$

$y = 1$

Place $y = 1$ in equation (I) and obtain the value of 'x'

$x + 7 \times 1 = 10$

$x + 7 = 10$

$x = 10 - 7$

$x = 3$

$\therefore$ Solution is $(x, y) = (3, 1)$

Q.5) Complete the following activities and rewrite it. **3**

1)Ans. Given equations are

$4x + 3y - 4 = 0$

$6x = 8 - 5y$

Or

$4x + 3y = 4$

$6x + 5y = 8$

$$D = \begin{vmatrix} 4 & 3 \\ 6 & 5 \end{vmatrix} \qquad D_x = \begin{vmatrix} 4 & 3 \\ 8 & 5 \end{vmatrix} \qquad D_y = \begin{vmatrix} 4 & 4 \\ 6 & 8 \end{vmatrix}$$

$= 4(5) - 3(6)$ $= 4(5) - 3(8)$ $= 4(8) - 6(4)$

$= \boxed{20} - 18$ $= 20 - 24$ $= 32 - \boxed{24}$

$= \boxed{2}$ $= -4$ $= \boxed{8}$

Thus,

$$x = \frac{D_x}{D} \qquad y = \frac{D_y}{D}$$

$= \boxed{\frac{(-4)}{2}}$ and $= \boxed{\frac{8}{2}}$

$= -2$ $= 4$

Q.6) Solve the following sub-question: (Any 1) **3**

1)Ans. Given equations are

$x + 2y = -1$

$2x - 3y = 12$

$$D = \begin{vmatrix} 1 & 2 \\ 2 & -3 \end{vmatrix} \qquad D_x = \begin{vmatrix} -1 & 2 \\ 12 & -3 \end{vmatrix} \qquad D_y = \begin{vmatrix} 1 & -1 \\ 2 & 12 \end{vmatrix}$$

$= 1(-3) - 2(2)$ $= -1(-3) - 2(12)$ $= 1(12) - 2(-1)$

$= -3 - 4$ $= 3 - 24$ $= 12 + 2$

$= -7$ $= -21$ $= 14$

Thus,

$$x = \frac{D_x}{D} \qquad y = \frac{D_y}{D}$$

$= \frac{(-21)}{(-7)}$ and $= \frac{14}{(-7)}$

$= 3$ $= -2$

Therefore, $(x, y) = (3, -2)$ is the solution.

2)Ans. Given equations

$5x + 3y = -11$

$2x + 4y = -10$

$$D = \begin{vmatrix} 5 & 3 \\ 2 & 4 \end{vmatrix} = (5 \times 4) - (2 \times 3) = 20 - 6 = 14$$

$$D_x = \begin{vmatrix} -11 & 3 \\ -10 & 4 \end{vmatrix} = (-11) \times 4 - (-10) \times 3 = -44 - (-30)$$

$$= -44 + 30 = -14$$

$$D_y = \begin{vmatrix} 5 & -11 \\ 2 & -10 \end{vmatrix} = 5 \times (-10) - 2 \times (-11) = -50 - (-22)$$

$$= -50 + 22 = -28$$

$x = \frac{D_x}{D} = \frac{-14}{14} = -1$ and $y = \frac{D_y}{D} = \frac{-28}{14} = -2$

$\therefore (x, y) = (-1, -2)$ is the solution.

Q.7) Solve the following sub-question: (Challenging que.) (Any 1) **4**

1)Ans. Suppose, the units place digit of the two digit number is y and the tens place digit is x.

$\therefore$ the number is $10x + y$

$\therefore$ the number obtained by reversing the digits is $10y + x$

$\therefore$ from the given conditions,

$(10x + y) + (10y + x) = 121$

$\therefore 11x + 11y = 121 \therefore x + y = 11$ ……. (I)

Also, $x = y + 7 \therefore x - y = 7$ …….(II)

$\therefore$ Adding (I) and (II), $2x = 18$ $x = 9$

$\therefore$ from (I) $a + y = 11$ $y = 2$

$\therefore$ the two digit number is 29.

2)Ans. $4m - 2n = -4; 4m + 3n = 16$

Given equations are

$4m - 2n = -4$

$4m + 3n = 16$

$$D = \begin{vmatrix} 4 & -2 \\ 4 & 3 \end{vmatrix} \quad D_x = \begin{vmatrix} -4 & -2 \\ 16 & 3 \end{vmatrix} \quad D_y = \begin{vmatrix} 4 & -4 \\ 4 & 16 \end{vmatrix}$$

$$= 4(3) - 4(-2) \quad = -4(3) - 16(-2) \quad = 4(16) - 4(-4)$$

$$= 12 + 8 \quad = -12 + 32 \quad = 64 + 16$$

$$= 20 \quad = 20 \quad = 80$$

Thus,

$x = \frac{D_x}{D} = \frac{20}{20} = 1$ and $y = \frac{D_y}{D} = \frac{80}{20} = 4$

Therefore, $(x, y) = (1, 4)$ is the solution