

# 1. Linear equation in two variables

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## Q.1(A) MCQ

1. To draw the graph of  $4x + 5y = 19$ , if  $x = 1$  is taken then what will be the value of  $y$ ?

- A) 4                      B) 3                      C) 2                      D) -3

2) For the equations with variables  $x$  and  $y$ , if  $D_x = 26$ ,  $D_y = -39$  and  $D = 13$  then  $x = ?$

- A) 2                      B) -3                      C) -2                      D) 3

3) Which of the following is linear equation in two variables?

- A)  $\frac{x}{3} + \frac{5}{y} = 6$     B)  $2x^2 - 3y = 8 - 3y$     C)  $x + 2y = 5 - 3y$     D)  $3x^2 + y$

4) which of the following is not the solution of  $3x + 6y = 12$ ?

- A) (-4,4)                      B) (0,2)                      C) (8, -2)                      D) (3,1)

5)  $\begin{vmatrix} 3 & 5 \\ 2 & x \end{vmatrix} = 2 \therefore x = \text{-----}$

- A) 3                      B) 4                      C) -3                      D) -4

6) For equations  $5x + 3y + 11 = 0$  and  $2x + 4y = -10$  find  $D$ .

- A) 14                      B) -14                      C) 26                      D) -26

7) If  $49x - 57y = 172$  and  $57x - 49y = 252$  then  $x + y = ?$

- A) 80                      B) 0                      C) 10                      D) 8

8) The solution of the equation  $2x - y = 2$  is -----.

- A) (2,2)                      B) (5,2)                      C) (2,5)                      D) (5,5)

The solution of the equation  $x - y = 10$  and  $x + y = 70$  is -----.

- A) (40,30)                      B) (30,40)                      C) (10,60)                      D) (50,20)

10) Find the value of  $D_x$  for the equation  $4x + 3y = 19$  and  $4x - 3y = -11$

- A) 24                      B) 0                      C) -24                      D) 108

**Q. 1 B) Each of 1 mark**

- 1) State with reason whether the equation  $3x^2 - 7y = 13$  is a linear equation with two variables?
- 2) Show the condition using variable  $x$  and  $y$ : Two numbers differ by 3
- 3) For the equation  $4x + 5y = 20$  find  $y$  when  $x = 0$
- 4) Write any two solutions of the equation  $x + y = 7$ .
- 5) Decide whether  $(0, 2)$  is the solution of the equation  $5x + 3y = 6$
- 6) Write any two solution of the equation  $a - b = -3$
- 7) If  $x + 2y = 5$  and  $2x + y = 7$  then find the value of  $x + y$
- 8) If  $Dx = 24$  and  $x = -3$  then find the value of  $D$ .
- 9) The cost of the book is 5 rupees more than twice the cost of a pen. Show this using linear equation by taking Cost of book( $x$ ) and cost of a pen( $y$ ).
- 10) If  $\frac{a}{4} + \frac{b}{3} = 4$ , write the equation in standard form.

**Q.2 A) Complete the activity (2 marks)**

- 1) Complete the table to draw the graph of  $2x - 3y = 3$ ,

X	-6	<input type="text"/>
y	<input type="text"/>	1
(x, y)	<input type="text"/>	<input type="text"/>

2. Solve the following to find the value of following determinant.

$$\begin{vmatrix} 3 & -2 \\ 4 & 5 \end{vmatrix} = 3 \times \boxed{\phantom{00}} - \boxed{\phantom{00}} \times 4 = \boxed{\phantom{00}} + 8 = \boxed{\phantom{00}}$$

- 3) Complete the activity to find the value of  $x$

$$3x + 2y = 11 \text{ ---- (I) and } 2x + 3y = 4 \text{ -----(II)}$$

Solution: Multiply equation (I) by ----- and equation (II) by -----.

$$\boxed{\phantom{00}} \times (3x + 2y = 11) \quad \therefore 9x + 6y = 33$$

$$\square \times (2x + 3y = 4) \quad \therefore 4x + 6y = 8$$

subtract (II) from (I),

$$\square x = 25$$

$$\therefore x = \square$$

4) If (2, 0) is the solution of  $2x + 3y = k$  then find the value of k by completing the activity

Solution: (2,0) is solution of the equation  $2x + 3y = k$

$$\text{Putting } x = \square \text{ and } y = \square$$

$$\therefore 2(\square) + 3 \times 0 = k$$

$$\therefore 4 + 0 = k$$

$$\therefore k \square =$$

5) To find the values of x and y for the equations  $x - 2y = 5$  and  $2x + 3y = 10$  complete the activity.

$$D = \begin{vmatrix} 1 & -2 \\ 2 & 3 \end{vmatrix} = 3 + 4 = 7$$

$$D_x = \begin{vmatrix} 5 & -2 \\ 10 & 3 \end{vmatrix} = \square$$

$$D_y = \begin{vmatrix} 1 & 5 \\ 2 & 10 \end{vmatrix} = \square$$

By Cramer's rule

$$x = \frac{D_x}{D} = \square \quad y = \frac{D_y}{D} = \square$$

### Q. 2 B) Each of 2 marks

1) The difference between an angle and its complement is  $10^\circ$  find measure of larger angle.

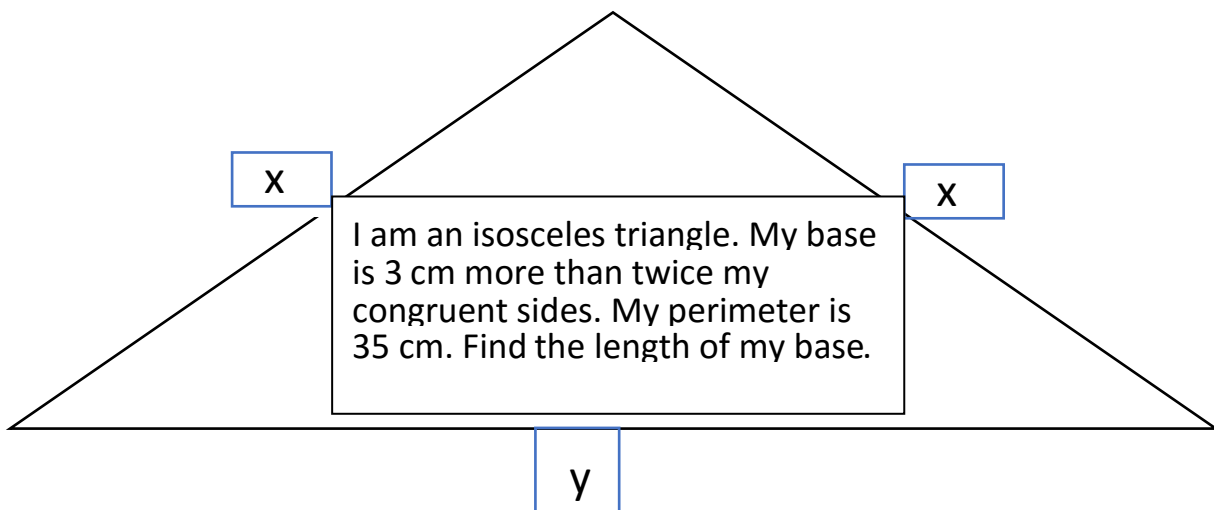
2) Find the value of  $\begin{vmatrix} 5 & 2 \\ 0 & -1 \end{vmatrix}$

3) For the equation  $y + 2x = 19$  and  $2x - 3y = -3$  Find the value of D

- 4) In the equation  $2x - y = 2$  if  $x = 3$  then find  $y = ?$
- 5) If  $(2, -5)$  is the solution of the equation  $2x - ky = 14$  then find  $k = ?$
- 6) For the equation  $a + 2b = 7$  find  $a$  when  $b = 4$
- 7) Decide whether  $x = 2$  and  $y = -1$  is the solution of the equation  $2x + y = 3$  or not?
- 8) Using variables  $a$  and  $b$  write any two equations whose solution is  $(0, 2)$
- 9) If  $52x + 65y = 183$  and  $65x + 52y = 168$  then find  $x + y = ?$
- 10) State with reason whether the point  $(3, -2)$  will lie on the graph of the equation  $5m - 3n = -21$ .

Q.3 A) Complete the activity.

1)



2) Complete the following table to draw the graph of  $3x - 2y = 18$

X	0	4	2	-1
Y	-9	-----	-----	-----
x, y	$(0, -9)$	$(--, --)$	$(--, --)$	-----

3) The sum of the two-digit number and the number obtained by interchanging the digits is 132. The digit in the ten's place is 2 more than the digit in the unit's place. Complete the activity to find the original number.

Activity: Let the digit in the unit's place is  $y$  and the digit in the ten's place is  $x$ .

$\therefore$  The number =  $10x + y$

∴ The number obtained by interchanging the digits =

∴ The sum of the number and the number obtained by interchanging the digits = 132

$$\therefore 10x + y + 10y + x = \boxed{\phantom{00}}$$

$$\therefore x + y = \boxed{\phantom{00}} \quad \text{(I)}$$

, By second condition,

Digit in the ten's place = digit in the unit's place + 2

$$\therefore x - y = 2 \quad \dots \text{(II)}$$

Solving equation (I) and (II)

$$\therefore x = \boxed{\phantom{00}} \quad y = \boxed{\phantom{00}}$$

Ans: The original number =

### Q.3 B) Each of 3 marks

- 1) Solve the given simultaneous equations graphically  $x + y = 5$  and  $y = 5$ ,
- 2) Ajay is younger than Vijay by 3 years. The sum of their ages is 25 years, what is the age of Ajay.
- 3) Solve by Cramer's rule,  $3x - 4y = 10$ ;  $4x + 3y = 5$
- 4) Difference between two numbers is 3, the sum of three times the bigger number and two times the smaller number is 19. Then find the numbers.
- 5) Solve:  $4m - 2n = -4$ ;  $4m + 3n = 16$
- 6) Solve:  $99x + 101y = 499$ ;  $101x + 99y = 501$

- 7) The length of the rectangle is 5 more than twice its breadth. The perimeter of a rectangle is 52 cm then find the length of the rectangle.
- 8) The graph of the equations  $2x - y - 4 = 0$  and  $x + y + 1 = 0$  intersect each other in point P (a, b) then find the coordinates of P?
- 9) The solution of the equation  $ax + by + 5 = 0$  and  $bx - ay - 12 = 0$  is (2, -3) Find the values of a and b.
- 10) A person starts a job with some fixed salary and yearly increment. After 4 years his salary is Rs.15000 and after 10 years it becomes Rs.18000. Then find his monthly salary and increment.
- 11). For the equation  $3x - 2y = 17$  find the value of x when  $y = -1$  and find the value of y when  $x = 3$ .

**Q.4 Solve (Each of 4 marks)**

- 1) Solve the following equations by graphical method,  $x - y = 1$ ;  $2x + y = 8$
- 2) Using the determinants given below form two linear equations and solve them.

$$D = \begin{vmatrix} 5 & 7 \\ 2 & -3 \end{vmatrix} \quad D_y = \begin{vmatrix} 5 & 4 \\ 2 & -10 \end{vmatrix}$$

- 3) For an A.P,  $t_{17} = 54$  and  $t_9 = 30$  find the first term(a) and common difference(d).
- 4) A train covered a certain distance at a uniform speed. If the train would have been 6 km/h faster, it would have taken 4 hours less than the scheduled time. And ,if the train was slower by 6 km/h it would have taken 6 hours more than the scheduled time. Find the length of the journey.
- 5) Solve,  $0.4x + 0.3y = 1.7$ ;  $0.7x - 0.2y = 0.8$
- 6) The semi perimeter of a rectangular shape garden is 36 m. The length of the garden is 4 m more than its breadth. Find the length and the breadth of the garden.

**Q. 5 Solve (Each of 3 marks)**

- 1) Form the simultaneous linear equation using the determinants.

$$D = \begin{vmatrix} 4 & -3 \\ 2 & 5 \end{vmatrix} \quad D_x = \begin{vmatrix} 5 & -3 \\ 9 & 5 \end{vmatrix} \quad D_y = \begin{vmatrix} 4 & 5 \\ 2 & 9 \end{vmatrix}$$

2) I held a number 75 in my mind.

Write any condition showing the relation between their digits.

Write the condition showing relation between the number and the number obtained by interchanging the digits.

3) Write any two linear equations in two variables in which the value of one variable is 12 and the other 10.

4) From the railway station I took a rickshaw to go home. It is decided that I have to pay Rs.  $X$  for the first kilometre and for each kilometre Rs.  $Y$  for the next. For 10 kilometres the fare is Rs. 40 and for 16 kilometres fare is Rs. 58. Find the fare for the first kilometre.