QUESTION BANK SOLUTION 2022-23 FOR SSC Maths 1 (Algebra)
Solution

1. Linear equation in two variables
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

Explanation
To draw the graph of 4x + 5y = 19, if x = 1
4x + 5y = 19
∴ 4 (1) + 5y = 19
∴ 4 + 5y = 19
∴ 5y = 19-4
∴ 5y = 15
∴ y = 15/5
∴ y = 3
Ans. B) 3

2) For the equations with variables x and y, if Dx = 26, Dy = −39 and D = 13 then x =?
A) 2 B) − 3 C) − 2 D) 3
Explanation:
if Dx = 26, Dy = −39 and D = 13

Using Cramer's Rule

$X = \frac{Dx}{x} = \frac{26}{13} = 2$
Ans. A) 2

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) $3x^2+y$

Ans. C) x+2y=5-3y

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)
Explanation
3x + 6y = 3(3) + 6(1)
= 9 + 6
= 15 ≠ 12
Ans. D) (3, 1)

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

A) 3 B) 4 C) – 3 D) – 4

Explanation

$\begin{vmatrix} 3 & 5 \\ 2 & x \end{vmatrix} = 2$

$\therefore 3x - 5(2) = 2$

$\therefore 3x - 10 = 2$

$\therefore 3x = 2 + 10$

$\therefore 3x = 12$

$\therefore x = \frac{12}{3} = 4$

Ans. B) 4

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

A) 14 B) – 14 C) 26 D) – 26

Explanation

5x + 3y + 11 = 0

5x + 3y = - 11 ……..(1)

2x + 4y = - 10 …….(2)

By using Cramer's Rule

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

Ans. A) 14

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

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

Explanation

49 x – 57 y = 172 ……(1)

57 x – 49 y = 252 ……(2)

Subtracting (1) from (2)

57 x – 49 y = 252

49 x – 57 y = 172

\- + -

8x + 8y = 80

$\therefore$ dividing the above equation by 8

x + y = 10

Ans. C) 10

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8) The solution of the equation 2x – y = 2 is ------.
A)(2,2) B) (5,2) C) (2,5) D) (5,5)
Explanation
Taking $x = 2$ and $y = 2$
2x – y
= 2 (2) – 2
= 4 – 2
= 2
LHS = RHS
∴ The solution of the equation 2x – y = 2 is (2,2)
Ans. A) (2,2)

9)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)

Ans. x – y = 10 ……(1)
x + y = 70 ……(2)
Adding (1) and (2)
2x = 80
∴ x = 40
Substituting x = 40 in equation (2)
x + y = 70
∴ 40 + y = 70
∴ y = 70 – 40
∴ y = 30
∴ The solution of the equation x – y = 10 and x + y = 70 is (40, 30)
Ans. A) (40, 30)

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
Explanation
$4x + 3y = 19$
$4x - 3y = -11$
By using Cramer's Rule

$$D_x = \begin{vmatrix} 19 & 3 \\ -11 & -3 \end{vmatrix} = (19 \times -3) - (3 \times -11) = -57 - (-33) = -57 + 33 = -24$$

Ans. A) -24

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?
Ans. Here, the degree of variable x is 2. Hence, this is not a linear equation in two variables.
2) Show the condition using variable x and y: Two numbers differ by 3
Ans. $x - y = 3$
3) For the equation 4x + 5y = 20 find y when x = 0
Ans. 4(0) + 5y = 20

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$\therefore$ 0 + 5y = 20

$\therefore$ 5y = 20

$\therefore$ y = $\frac{20}{5}$

$\therefore$ y = 4

4) Write any two solutions of the equation x + y = 7.
Ans. When x = 1 ,
x + y = 7

$\therefore$ 1 + y = 7

$\therefore$ y = 7 – 1

$\therefore$ y = 6

When x = 2,
x + y = 7

$\therefore$ 2 + y = 7

$\therefore$ y = 7 – 2

$\therefore$ y = 5

Ans. x = 1, y = 6
X = 2, y = 5

5) Decide whether (0, 2) is the solution of the equation 5x + 3y = 6
Ans. Putting x = 0 and y = 2 in eq 5x + 3y =6

$\therefore$ LHS = 5(0) + 3(2)
= 0 + 6
= 6
LHS = RHS

$\therefore$ (0,2) is the solution of the equation 5x + 3y = 6

6) Write any two solution of the equation a – b = - 3
Ans. When a =1 then
a – b = -3

$\therefore$ 1 – b = -3

$\therefore$ - b = -3 -1

$\therefore$ - b = -4

$\therefore$ b = 4

When a = 2
a – b = -3

$\therefore$ 2 – b = -3

$\therefore$ - b = -3 -2

$\therefore$ - b = -5

$\therefore$ b = 5

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Ans. Two solution of the equation a – b = - 3 are
a = 1, b= 4 and a = 2, b= 5

7) If x+2y=5 and 2x+y=7 then find the value of x+y
Let x+2y=5 …… (1)
and 2x+y=7 ….. (2)
Adding eq (1) and (2) we get
3x + 3y = 12
Divinding by 3 we get
x + y = 4
Ans. x + y = 4

8) If D_x = 24 and x = - 3 then find the value of D.
Ans. x = $\frac{Dx}{D}$
∴ D = $\frac{Dx}{x}$
∴ D = $\frac{24}{-3}$
∴ D = -8

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).
Ans. x = 2y + 5
x – 2y = 5

10) If $\frac{a}{4}+\frac{b}{3}$ = 4 , write the equation in standard form.
Ans. $\frac{3a+4b}{12}$ = 4
∴ 3a + 4b = 48
∴ 3a + 4b -48 = 0

Q.2 A) Complete the activity (2 marks)
1) Complete the table to draw the graph of 2x – 3y = 3,

x	-6	**3**
y	**-5**	1
(x,y)	**(-6, -5)**	**(3, 1)**

When x = -6
2x – 3y = 3
∴ 2(-6) – 3y = 3
∴ -12 – 3y = 3
∴ -3y = 3 + 12

$\therefore$ -3y = 15

$\therefore$ y = $\frac{15}{-3}$

$\therefore$ y = -5

When y = 1

2x – 3y = 3

$\therefore$ 2x – 3(1) = 3

$\therefore$ 2x – 3 = 3

$\therefore$ 2x = 3 + 3

$\therefore$ 2x = 6

$\therefore$ x = $\frac{6}{2}$

$\therefore$ x = 3

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

$\begin{vmatrix} 3 & -2 \\ 4 & 5 \end{vmatrix}$ = (3 x **5**) – **(-2** x 4) = **15** + 8 = **23**

3) Complete the activity to find the value of x

3 x + 2 y = 11 ---- (I) and 2x + 3y = 4 ------(II)

Solution: Multiply equation (I) by 3 ----- and equation (II) by 2.

3× (3 x + 2 y = 11) $\therefore$ (9x + 6y = 33)

2 x (2x + 3y = 4) $\therefore$ (4x + 6y = 8) subtract (II) from (I),

5x = 25

$\therefore$ x = 5

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

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

$\therefore$ 2(**2**) + 3 × 0 = k

$\therefore$ 4 + 0 = k

$\therefore$ k = **4**

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

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

D_x = $\begin{vmatrix} 5 & -2 \\ 10 & 3 \end{vmatrix}$ = 15 + 20 = 35

D_y = $\begin{vmatrix} 1 & 5 \\ 2 & 10 \end{vmatrix}$ = 10 - 10 = 0

By Cramer's Rule

x = $\frac{Dx}{D}$ = 5 y = $\frac{Dy}{D}$ = 0

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