Exercise 13.2

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Question 1: Write two solutions for each of the following equations:

(i) 3x + 4y = 7

(ii) x = 6y

(iii) x + πy = 4

(iv) 2/3x – y = 4.

Solution:

(i) 3x + 4y =7 ….(1)

Step 1: Isolate above equation in y.

Subtract 3x from both the sides,

3x + 4y – 3x = 7 – 3x

4y = 7 – 3x

Divide each side by 4

y = 1/4 x (7 – 3x) ….(2)

Step 2: Find Solutions

Substituting x = 1 in (2)

y = 1/4 x (7 – 3) = 1/4 x 4 = 1

Thus x = 1 and y = 1 is the solution of 3x + 4y = 7

Again, Substituting x = 2 in (2)

y = 1/4 x (7 – 3 x 2) = 1/4 x 1 = 1/4

Thus x = 2 and y = 1/4 is the solution of 3x + 4y = 7

Therefore, (1, 1) and (2, 1/4) are two solution of 3x + 4y = 7.

(ii) Given: x = 6y

Substituting x =0 in the given equation,

0 = 6y

or y = 0

Thus (0,0) is one solution

Again, substituting x=6

6 = 6y

or y = 1

Thus, (6, 1) is another solution.

Therefore, (0, 0) and (6, 1) are two solutions of x = 6y.

(iii) Given: $x + \pi y = 4$

Substituting x = 0 => $0 + \pi y = 4 \Rightarrow y = 4/\pi$

Substituting y = 0 => $x + 0 = 4 \Rightarrow x = 4$

Therefore, $(0, 4/\pi)$ and (4, 0) are two solutions of $x + \pi y = 4$.

(iv) Given: $2/3\ x - y = 4$

Substituting x = 0 => $0 - y = 4 \Rightarrow y = -4$

Substituting x = 3 => $2/3 \times 3 - y = 4 \Rightarrow 2 - y = 4 \Rightarrow y = -2$

Therefore, (0, -4) and (3, -2) are two solutions of $2/3\ x - y = 4$.

Question 2: Write two solutions of the form x = 0, y = a and x = b, y = 0 for each of the following equations :
(i) 5x – 2y =10
(ii) -4x + 3y =12
(iii) 2x + 3y = 24

Solution:

(i) Given: 5x – 2y = 10

Substituting x = 0 => 5 × 0 – 2y = 10 => – 2y = 10 => – y = 10/2 => y = – 5

Thus x =0 and y = -5 is the solution of 5x-2y = 10

Substituting y = 0 => 5x - 2 x 0 = 10 => 5x = 10 => x = 2

Thus x =2 and y = 0 is a solution of 5x - 2y = 10

(ii) Given, - 4x + 3y = 12

Substituting x = 0 => -4 × 0 + 3y = 12 => 3y = 12 => y = 4

Thus x = 0 and y = 4 is a solution of the -4x + 3y = 12

Substituting y = 0 => -4 x + 3 x 0 = 12 => – 4x = 12 => x = -3

Thus x = -3 and y = 0 is a solution of -4x + 3y = 12

(iii) Given, 2x + 3y = 24

Substituting x = 0 => 2 x 0 + 3y = 24 => 3y =24 => y = 8

Thus x = 0 and y = 8 is a solution of 2x+ 3y = 24

Substituting y = 0 => 2x + 3 x 0 = 24 => 2x = 24 => x =12

Thus x = 12 and y = 0 is a solution of 2x + 3y = 24

Question 3: Check which of the following are solutions of the equation 2x - y = 6 and which are not:

(i) (3 , 0) **(ii) (0 , 6)** **(iii) (2 , -2)** **(iv) (√3, 0)** **(v) (1/2 , -5)**

Solution:

(i) Check for (3, 0)
Put x = 3 and y = 0 in equation 2x - y = 6
2(3) – (0) = 6
6 = 6
True statement.
=> (3,0) is a solution of 2x - y = 6.

(ii) Check for (0, 6)
Put x = 0 and y = 6 in 2x - y = 6
2 x 0 - 6 = 6
-6 = 6
False statement.

=> (0, 6) is not a solution of 2x - y = 6.

(iii) Check for (2, -2)
Put x = 0 and y = 6 in 2x - y = 6

2 x 2 - (-2) = 6

4 + 2 = 6
6 = 6
True statement.

=> (2,-2) is a solution of 2x - y = 6.

(iv) Check for (√3, 0)
Put x = √3 and y = 0 in 2x - y = 6

2 x √3 – 0 = 6
2 √3 = 6
False statement.

=>(√3, 0) is not a solution of 2x - y = 6.

(v) Check for (1/2, -5)
Put x = 1/2 and y = -5 in 2x - y = 6

2 x (1/2) – (-5) = 6

1 + 5 = 6
6 = 6

True statement.

=> (1/2, -5) is a solution of 2x - y = 6.

Question 4: If x = -1, y = 2 is a solution of the equation 3x + 4y = k, find the value of k.

Solution:
Given, 3 x + 4 y = k

(-1, 2) is the solution of 3x + 4y = k, so it satisfy the equation.

Substituting x = -1 and y = 2 in 3x + 4y = k, we get

3 (– 1) + 4(2) = k

- 3 + 8 = k

k = 5

The value of k is 5.

Question 5: Find the value of λ, if x = –λ and y = 5/2 is a solution of the equation x + 4y - 7 = 0

Solution:
Given, (-λ, 5/2) is a solution of equation 3x + 4y = k

Substituting x = – λ and y = 5/2 in x + 4y – 7 = 0, we get

– λ + 4 (5/2) – 7 =0

-λ + 10 – 7 = 0

λ = 3

Question 6: If x = 2 α + 1 and y = α -1 is a solution of the equation 2x – 3y + 5 = 0, find the value of α.

Solution:

Given, (2 α + 1, α – 1) is the solution of equation 2x – 3y + 5 = 0.

Substituting x = 2 α + 1 and y = α – 1 in 2x – 3y + 5 = 0, we get

2(2 α + 1) – 3(α – 1) + 5 = 0

4 α + 2 – 3 α + 3 + 5 = 0

α + 10 = 0

α = – 10

The value of α is -10.

Question 7: If x = 1 and y = 6 is a solution of the equation 8x – ay + a^2 = 0, find the values of a.

Solution:
Given, (1 , 6) is a solution of equation 8x - ay + a^2 = 0

Substituting x = 1 and y = 6 in 8x – ay + a^2 = 0, we get

8 x 1 – a x 6 + a^2 = 0

=> a^2 – 6a + 8 = 0 (quadratic equation)

Using quadratic factorization

a^2 – 4a – 2a + 8 = 0

a(a – 4) – 2 (a – 4) = 0

(a – 2) (a – 4)= 0

a = 2, 4

Values of a are 2 and 4.