

## Exercise 14(A)

Find, which of the following points lie on the line  $x - 2y + 5 = 0$ :

- (i) (1, 3)      (ii) (0, 5)  
 (iii) (-5, 0)    (iv) (5, 5)  
 (v) (2, -1.5)    (vi) (-2, -1.5)

**Solution:**

Given line equation is  $x - 2y + 5 = 0$ .

- (i) On substituting  $x = 1$  and  $y = 3$  in the given line equation, we have  
 L.H.S. =  $1 - 2(3) + 5 = 1 - 6 + 5 = 6 - 6 = 0 = \text{R.H.S.}$   
 Hence, the point (1, 3) lies on the given line.
- (ii) On substituting  $x = 0$  and  $y = 5$  in the given line equation, we have  
 L.H.S. =  $0 - 2(5) + 5 = -10 + 5 = -5 \neq \text{R.H.S.}$   
 Hence, the point (0, 5) does not lie on the given line.
- (iii) On substituting  $x = -5$  and  $y = 0$  in the given line equation, we have  
 L.H.S. =  $-5 - 2(0) + 5 = -5 - 0 + 5 = 5 - 5 = 0 = \text{R.H.S.}$   
 Hence, the point (-5, 0) lies on the given line.
- (iv) On substituting  $x = 5$  and  $y = 5$  in the given line equation, we have  
 L.H.S. =  $5 - 2(5) + 5 = 5 - 10 + 5 = 10 - 10 = 0 = \text{R.H.S.}$   
 Hence, the point (5, 5) lies on the given line.
- (v) On substituting  $x = 2$  and  $y = -1.5$  in the given line equation, we have  
 L.H.S. =  $2 - 2(-1.5) + 5 = 2 + 3 + 5 = 10 \neq \text{R.H.S.}$   
 Hence, the point (2, -1.5) does not lie on the given line.
- (vi) On substituting  $x = -2$  and  $y = -1.5$  in the given line equation, we have  
 L.H.S. =  $-2 - 2(-1.5) + 5 = -2 + 3 + 5 = 6 \neq \text{R.H.S.}$   
 Hence, the point (-2, -1.5) does not lie on the given line.

**1. State, true or false:**

- (i) the line  $x/2 + y/3 = 0$  passes through the point (2, 3).  
 (ii) the line  $x/2 + y/3 = 0$  passes through the point (4, -6).  
 (iii) the point (8, 7) lies on the line  $y - 7 = 0$ .  
 (iv) the point (-3, 0) lies on the line  $x + 3 = 0$ .  
 (v) if the point (2, a) lies on the line  $2x - y = 3$ , then  $a = 5$ .

**Solution:**

- (i) The given line is  $x/2 + y/3 = 0$   
 Substituting  $x = 2$  and  $y = 3$  in the given equation,  
 L.H.S =  $2/2 + 3/3 = 1 + 1 = 2 \neq \text{R.H.S}$   
 Hence, the given statement is false.

- (ii) The given line is  $x/2 + y/3 = 0$   
Substituting  $x = 4$  and  $y = -6$  in the given equation,  
L.H.S =  $4/2 + (-6)/3 = 2 - 2 =$  R.H.S  
Hence, the given statement is true.
- (iii) The given line is  $y - 7 = 0$   
Substituting  $y = 7$  in the given equation,  
L.H.S =  $y - 7 = 7 - 7 = 0 =$  R.H.S.  
Hence, the given statement is true.
- (iv) The given line is  $x + 3 = 0$   
Substituting  $x = -3$  in the given equation,  
L.H.S. =  $x + 3 = -3 + 3 = 0 =$  R.H.S  
Hence, the given statement is true.
- (v) The point  $(2, a)$  lies on the line  $2x - y = 3$ .  
Substituting  $x = 2$  and  $y = a$  in the given equation, we get  
So,  $2(2) - a = 3$   
 $4 - a = 3$   
 $a = 4 - 3 = 1$   
Hence, the given statement is false.

**2. The line given by the equation  $2x - y/3 = 7$  passes through the point  $(k, 6)$ ; calculate the value of  $k$ .**

**Solution:**

Given line equation is  $2x - y/3 = 7$  passes through the point  $(k, 6)$ .  
So, on substituting  $x = k$  and  $y = 6$  in the given equation, we have  
 $2k - 6/3 = 7$   
 $6k - 6 = 21$   
 $6k = 27$   
 $k = 27/6 = 9/2$   
 $k = 4.5$

**3. For what value of  $k$  will the point  $(3, -k)$  lie on the line  $9x + 4y = 3$ ?**

**Solution:**

The given line equation is  $9x + 4y = 3$ .  
On putting  $x = 3$  and  $y = -k$ , we have  
 $9(3) + 4(-k) = 3$   
 $27 - 4k = 3$   
 $4k = 27 - 3 = 24$   
 $k = 6$

**4. The line  $3x/5 - 2y/3 + 1 = 0$  contains the point  $(m, 2m - 1)$ ; calculate the value of  $m$ .**

**Solution:**

The equation of the given line is  $3x/5 - 2y/3 + 1 = 0$

On putting  $x = m$ ,  $y = 2m - 1$ , we have

$$\frac{3m}{5} - \frac{2(2m - 1)}{3} + 1 = 0$$

$$\frac{3m}{5} - \frac{4m - 2}{3} = -1$$

$$\frac{9m - 20m + 10}{15} = -1$$

$$9m - 20m + 10 = -15$$

$$-11m = -25$$

$$m = 25/11$$

$$m = 2\frac{3}{11}$$

**5. Does the line  $3x - 5y = 6$  bisect the join of  $(5, -2)$  and  $(-1, 2)$ ?**

**Solution:**

It's known that the given line will bisect the join of A  $(5, -2)$  and B  $(-1, 2)$ , if the co-ordinates of the mid-point of AB satisfy the line equation.

The co-ordinates of the mid-point of AB are

$$(5-1/2, -2+2/2) = (2, 0)$$

On substituting  $x = 2$  and  $y = 0$  in the given line equation, we have

$$\text{L.H.S.} = 3x - 5y = 3(2) - 5(0) = 6 - 0 = 6 = \text{R.H.S.}$$

Therefore, the line  $3x - 5y = 6$  bisect the join of  $(5, -2)$  and  $(-1, 2)$ .