1. Find is the following points lie on the given line or not:

(i) (1, 3) on the line 2x + 3y = 11

Solution:-

From the question it is given that,

Point = (1, 3)

Line = 2x + 3y = 11

Now, put x = 1 and y = 3

Consider Left Hand Side (LHS) = 2x + 3y

= 2(1) + 3(3)

= 2 + 9

= 11

Right Hand Side (RHS) = 11

By comparing LHS and RHS

LHS = RHS

11 = 11

Therefore, point lie on the given line.

(ii) (5, 3) on the line 3x - 5y + 5 = 0

Solution:-

From the question it is given that,

Point = (5, 3)

Line = 3x - 5y + 5 = 0

Now, put x = 5 and y = 3

Consider Left Hand Side (LHS) = 3x - 5y + 5

= 3(5) - 5(3) + 5

= 15 – 15 + 5

= 5

Right Hand Side (RHS) = 0

By comparing LHS and RHS

LHS ≠ RHS

5 ≠ 0

Therefore, point does not lie on the given line.

(iii) (2, 4) on the line y = 2x - 1

Solution:-

From the question it is given that,

Point = (2, 4)

Line = y = 2x - 1
Now, put x = 2 and y = 4
Consider Left Hand Side (LHS) = 4
Right Hand Side (RHS) = 2x – 1
= 2(2) – 1
= 4 – 1
= 3
By comparing LHS and RHS
LHS ≠ RHS
4 ≠ 3
Therefore, point does not lie on the given line.

(iv) (-1, 5) on the line 3x = 2y - 13
Solution:-
From the question it is given that,
Point = (-1, 5)
Line = 3x = 2y - 15
Now, put x = -1 and y = 5
Consider Left Hand Side (LHS) = 3x
= 3(-1)
= - 3
Right Hand Side (RHS) = 2y – 13
= 2(5) – 15
= 10 – 13
= -3
By comparing LHS and RHS
LHS = RHS
- 3 = - 3
Therefore, point lie on the given line.

(v) (7, -2) on the line 5x + 7y = 11
Solution:-
From the question it is given that,
Point = (7, -2)
Line = 5x + 7y = 11
Now, put x = 7 and y = -2
Consider Left Hand Side (LHS) = 5x + 7y

= 5(7) +7(-2)
= 35 - 14
= 21

Right Hand Side (RHS) = 11
By comparing LHS and RHS
LHS ≠ RHS
21 ≠11
Therefore, point does not lie on the given line.

2. Find the value of m if the line 2x + 5y + 12 = 0 passes through the point (4, m)
Solution:-
From the question it is given that,
The line 2x + 5y + 12 = 0 passes through the point (4, m)
We have to find the value of m,
So, put x = 4 and y = m
2x + 5y + 12 = 0
2(4) + 5(m) + 12 = 0
8 + 5m + 12 = 0
5m + 20 = 0
5m = - 20
m = -20/5
m = -4
Therefore, the value of m is – 4.

3. Find the value of P if the line 3y = 5x – 7 passes through the point (p, 6).
Solution:-
From the question it is given that,
The line 3y = 5x – 7 passes through the point (p, 6)
We have to find the value of p,
So, put x = p and y = 6
3y = 5x – 7
3(6) = 5(P) – 7
18 = 5P – 7
18 + 7 = 5P
25 = 5P
P = 25/5
P = 5

Therefore, the value of P is 5.

4. Find the value of a if the line 4x = 11 – 3y passes through the point (a, 5).
Solution:-
From the question it is given that,
The line 4x = 11 – 3y passes through the point (a, 5)
We have to find the value of a,
So, put x = a and y = 5

$4x = 11 – 3y$
$4(a) = 11 – 3(5)$
$4a = 11 – 15$
$4a = - 4$
$a = -4/4$
$a = - 1$

Therefore, the value of a is -1.

5. The line y = 6 – 3x/2 passes through the point (r, 3). Find the value of r.
Solution:-
From the question it is given that,
The line y = 6 – 3x/2 passes through the point (r, 3)
We have to find the value of r,
So, put x = r and y = 3

$y = 6 – 3x/2$
$3 = 6 – (3(r))/2$
$3 = (12 – 3r)/2$
$6 = 12 – 3r$
$3r = 12 – 6$
$3r = 6$
$r = 6/3$
$r = 2$

Therefore, the value of r is 2.

6. The line (3 + 5y)/2 = (4x - 7)/3 passes through the point (1, k). find the value of k
Solution:-
From the question it is given that,
The line (3 + 5y)/2 = (4x - 7)/3 passes through the point (1, k)
We have to find the value of k,

So, put x = 1 and y = k

(3 + 5y)/2 = (4x - 7)/3

(3 + 5(k))/2 = (4(1) - 7)/3

3(3 + 5k) = 2(4 - 7)

9 + 15k = 2(- 3)

9 + 15k = - 6

15k = - 6 – 9

15k = - 15

k = -15/15

k = - 1

Therefore, the value of k is - 1.

7. The line 4x + 3y = 11 bisects the join of (6, m) and (4, 9). Find the value of m.

Solution:-

Let us assume the point of intersection of CD and line 4x + 4y = 11 be the point Q(a, b)

From the question it is given that, line 4x + 3y = 11 bisects the line segment CD,

So, CQ: QD = 1: 1

Then, the coordinates of Q are,

Q(a, b) = Q[((6 + 4)/2), ((m - 9)/2)]

= Q[5, ((m - 9)/2)]

Since Q(a, b) lies on the line 4x + 3y = 11,

Where, x = 5, y = (m - 9)/2

4(5) + 3((m - 9)/2) = 11

20 + (3m - 27)/2 = 11

40 + 3m – 27 = 22

3m + 13 = 22

3m = 22 – 13

3m = 9

m = 9/3

m = 3

Therefore, value of m is 3.

8. The line 2x - 5y + 31 = 0 bisects the join of (-4, 5) and (p, 9). Find the value of p.

Solution:-

Let us assume the point of intersection of CD and line 4x + 4y = 11 be the point Q(a, b)

From the question it is given that, line 2x - 5y + 31 = 0 bisects the line segment CD,

So, CQ: QD = 1: 1

Then, the coordinates of Q are,
Q(a, b) = Q[((-4 + P)/2), ((5 + 9)/2)]
= Q[((-4 + P)/2), 7]
Since Q(a, b) lies on the line 2x - 5y + 31 = 0,
Where, x = (-4 + P)/2, y = 7
2((-4 + P)/2) – 5(7) + 31 = 0
(-8 + 2P)/2 – 35 + 31 = 0
(-8 + 2P)/2 – 4 = 0
-8 + 2P – 8 = 0
- 16 + 2P = 0
2P = 16
P = 16/2
P = 8
Therefore, value of P is 8.

9. The line segment formed by the points (3, 7) and (-7, Z) is bisected by the line 3x + 4y = 18. Find the value of z.
Solution:-
Let us assume the point of intersection of CD and line 3x + 4y = 18 be the point Q(a, b)
From the question it is given that, line 3x + 4y = 18 bisects the line segment CD,
So, CQ: QD = 1: 1
Then, the coordinates of Q are,
Q(a, b) = Q[((-3 + 7)/2), ((7 + z)/2)]
= Q[-2, ((7 + z)/2)]
Since Q(a, b) lies on the line 3x + 4y = 18,
Where, x = - 2, y = (7 + z)/2
3x + 4y = 18
3(-2) + 4((7 + z)/2) = 18
- 6 + (28 + 4z)/2 = 18
- 12 + 28 + 4z = 36
16 + 4z = 36
4z = 36 – 16
4z = 20
z = 20/4
z = 5
Therefore, value of z is 5.

10. The line 5x – 3y + 1 = 0 divides the join of (2, m) and (7, 9) in the ratio 2: 3. Find the value of m.

Solution:-

Let us assume the point of intersection of CD and line 5x – 3y + 1 = 0 be the point Q(a, b)
From the question it is given that, line 5x – 3y + 1 = 0 divides the line segment CD are in the ratio 2: 3,
So, CQ: QD = 2: 3
So, Point C become 3(2, m) = (6, 3m)
D become 2(7, 9) = (14, 18)
Then, the coordinates of Q are,
Q(a, b) = Q[((14 + 6)/5), ((18 + 3m)/5)]
= Q[4, ((18 + 3m)/5)]
Since Q(a, b) lies on the line 5x – y + 1 = 0,
Where, x = 4, y = (18 + 3m)/5
5x – 3y + 1 = 0
5(4) – 3((18 + 3m)/5) + 1 = 0
20 – (54 + 9m)/5 + 1 = 0
21 - (54 + 9m)/5 = 0
105 – 54 - 9m = 0
51 - 9m = 0
9m = 51
m = 51/9
m = 17/3 … [because divide both by 3]
Therefore, value of m is 17/3.

11. The line 7x – 8y = 4 divides the join of (-8, -4) and (6, k) in the ratio 2: 5. Find the value of k.

Solution:-

Let us assume the point of intersection of CD and line 7x – 8y = 4 be the point Q(a, b)
From the question it is given that, line 7x – 8y = 4 divides the line segment CD are in the ratio 2: 5,
So, CQ: QD = 2: 5
So, Point C become 5(-8, -4) = (-40, -20)
D become 2(6, k) = (12, 2k)
Then, the coordinates of Q are,
Q(a, b) = Q[((12 - 40)/7), ((2k - 20)/7)]
= Q[-4, ((2k - 20)/7)]

Since Q(a, b) lies on the line 7x – 8y = 4,
Where, x = - 4, y = (2k - 20)/7

7(-4) – 8((2k - 20)/7) = 4
- 28 – (16k - 160)/7 = 4
- 196 – 16k + 160 = 28
- 36 – 16k = 28
16k = - 36 - 28
16K = - 64
K = -64/16
K = -4

Therefore, value of k is - 4.

12. The line 5x + 3y = 25 divides the join of (b, 4) and (5, 8) in the ratio 1: 3. Find the value of b.

Solution:-

Let us assume the point of intersection of CD and line 5x + 3y = 25 be the point Q(a, b)
From the question it is given that, line 5x + 3y = 25 divides the line segment CD are in the ratio 1: 3,
So, CQ: QD = 1: 3
So, Point C become 3(b, 4) = (3b, 12)
D become 1(5, 8) = (5, 8)
Then, the coordinates of Q are,
Q(a, b) = Q[((5 + 3b)/4), ((8 + 12)/4)]
= Q[((5 + 3b)/4), 5]
Since Q(a, b) lies on the line 5x + 3y = 25,
Where, x = (5 + 3b)/4, y = 5

5((5 + 3b)/4) + 3(5) = 25
(25 + 15b)/4 + 15 = 25
25 + 15b + 60 = 100
15b + 85 = 100
15b = 100 – 85
15b = 15
b = 15/15
b = 1

Therefore, value of b is 1.

13. P is a point on the line segment AB dividing it in the ratio 2: 3. If the coordinates of

A and B are (-2, 3) and (8, 8), find if P lies on the line 7x – 2y = 4.

Solution:-

From the question it is given that,

The coordinates of A and B are (-2, 3) and (8, 8)

The line segment AB dividing it in the ratio 2: 3

So, AP: PB = 2: 3

Then, A = 3(-2, 3) = (-6, 9)

B = 2(8, 8) = (16, 16)

Then, the coordinates of P are,

P(a, b) = P[((16 - 6)/5), ((16 + 9)/5)]

= P[2, 5]

Since P(a, b) lies on the line 7x – 2y = 4,

Where, x = 2, y = 5

Consider Left Hand Side (LHS) = 7x - 2y

= 7(2) – 2(5)

= 14 – 10

= 4

Right Hand Side (RHS) = 4

By comparing LHS and RHS

LHS = RHS

4 = 4

Therefore, point P(2, 5) lie on the given line 7x – 2y = 4.

14. L is a point on the line segment PQ dividing it in the ratio 1: 3. If the coordinates of P and Q are (3, 7) and (11, -5) respectively, find if L lies on the line 2x + 5y = 20.

Solution:-

From the question it is given that,

The coordinates of P and Q are (3, 7) and (11, -5) respectively

The line segment PQ dividing it in the ratio 1: 3

So, LP: LQ = 1: 3

Then, P = 3(3, 7) = (9, 21)

Q = 1(11, -5) = (11, -5)

Then, the coordinates of L are,

L(a, b) = L[((11 + 9)/4), ((- 5 + 21)/4)]

= L[5, 4]

Since L(a, b) lies on the line 2x + 5y = 20,

Where, x = 5, y = 4

Consider Left Hand Side (LHS) = 2x + 5y
= 2(5) + 5(4)
= 10 + 20
= 30
Right Hand Side (RHS) = 20
By comparing LHS and RHS
LHS ≠ RHS
30 ≠ 20
Therefore, point L(a, b) does not lie on the given line 2x + 5y = 20.

15. The line segment formed by two points A(2, 3) and B(5, 6) is divided by a point in the ratio 1: 2. Find, whether the point of intersection lies on the line 3x – 4y + 5 = 0.
Solution:-
From the question it is given that,
The coordinates of A(2, 3) and B(5, 6).
The line segment AB dividing it in the ratio 1: 2
So, AL: LB = 1: 3
Then, A = 2(2, 3) = (4, 6)
B = 1(5, 6) = (5, 6)
Then, the coordinates of L are,
L(a, b) = L[((5 + 4)/3), ((6 + 6)/3)]
= L[3, 4]
Since L(a, b) lies on the line 3x – 4y + 5 = 0,
Where, x = 3, y = 4
Consider Left Hand Side (LHS) = 3x - 4y + 5
= 3(3) - 4(4) + 5
= 9 – 16 + 5
= - 2
Right Hand Side (RHS) = 0
By comparing LHS and RHS
LHS ≠ RHS
-2 ≠ 0
Therefore, point L(a, b) does not lie on the given line 3x – 4y + 5 = 0.