RD Sharma Solutions Class 10 Maths Chapter 3 Exercise 3.2: Solving pairs of linear equations in two variables is the main goal of Exercise 3.2 of Chapter 3 in RD Sharma's Class 10 Maths book. The substitution procedure, which entails solving one equation for one variable and then replacing it into the other equation, is highlighted in this exercise.

Finding unique values for both variables that fulfil both equations requires simplifying the equations. To guarantee accuracy, problems in this exercise frequently call for careful value substitution and rearranging. Working through these problems, students gain a firm grasp of systematic substitution, which equips them for increasingly challenging algebraic applications.

RD Sharma Solutions Class 10 Maths Chapter 3 Exercise 3.2 Overview

Chapter 3, Exercise 3.2 in RD Sharma's Class 10 Maths book is crucial for building foundational skills in solving pairs of linear equations using the substitution method. Mastering these methods helps students develop logical thinking and problem-solving skills essential for algebra and other mathematical applications.

By working through these problems, students learn to isolate variables, manage complex expressions, and find precise solutions, skills that are applicable across science and engineering fields. Additionally, understanding linear equations in two variables forms the basis for future studies in topics like coordinate geometry, calculus, and real-life problem modeling.

RD Sharma Solutions Class 10 Maths Chapter 3 Exercise 3.2 Pair of Linear Equations in Two Variables

Below is the RD Sharma Solutions Class 10 Maths Chapter 3 Exercise 3.2 Pair of Linear Equations in Two Variables -

Solve the following system of equations graphically:

1. $x + y = 3$

$2x + 5y = 12$

Solution:

Given,

$x + y = 3$……. (i)

2x + 5y = 12……. (ii)

For equation (i),

When y = 0, we have x =3

When x= 0, we have y =3

Thus we have the following table giving points on the line x + y = 3

x	0	3
y	3	0

For equation (ii),

We solve for y:

⇒ y = (12 – 2x)/5

So, when x = 1

y = (12 – 2(1))/5 = 2

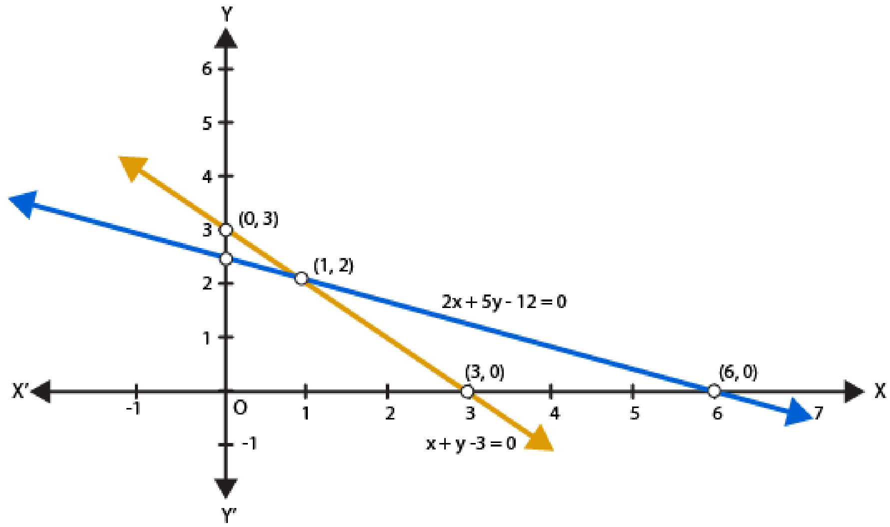
And, when x = 6

⇒ y = (12 – 2(6))/5 = 0

Thus we have the following table giving points on the line 2x + 5y = 12

x	1	6
y	2	0

Graph of the equations (i) and (ii) is as below:



Clearly the two lines intersect at a single point P (1, 2)

Hence, x= 1 and y = 2

2. x – 2y = 5

2x + 3y = 10

Solution:

Given,

x – 2y = 5……. (i)

2x + 3y = 10……. (ii)

For equation (i),

⇒ y = (x – 5)/2

When y = 0, we have x = 5

When x = 1, we have y = -2

Thus we have the following table giving points on the line **x – 2y = 5**

x	5	1
y	0	-2

For equation (ii),

We solve for y:

⇒ $y = (10 – 2x)/3$

So, when $x = 5$

$y = (10 – 2(5))/3 = 0$

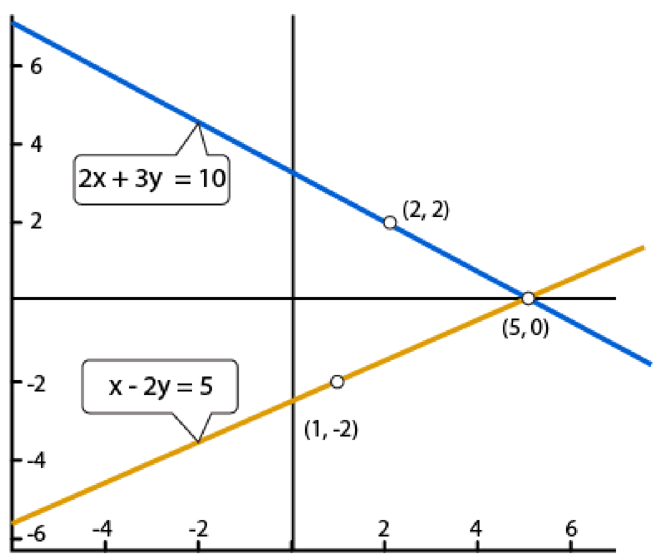
And, when $x = 2$

⇒ $y = (10 – 2(2))/3 =2$

Thus, we have the following table giving points on the line **2x + 3y = 10**

x	5	2
y	0	2

Graph of the equations (i) and (ii) is as below:



Clearly the two lines intersect at a single point P (5, 0)

Hence, $x= 5$ and $y = 0$

3. 3x+ y + 1 = 0

2x – 3y + 8 = 0

Solution:

Given,

3x+ y + 1 = 0 ……. (i)

2x – 3y + 8 = 0……. (ii)

For equation (i),

$\Rightarrow y = -(1 + 3x)$

When $x = 0$, we have $y = -1$

When $x = -1$, we have $y = 2$

Thus, we have the following table giving points on the line **3x+ y + 1 = 0**

x	-1	0
y	2	-1

For equation (ii),

We solve for y:

$\Rightarrow y = (2x + 8)/ 3$

So, when $x = -4$

$y = (2(-4) + 8)/3 = 0$

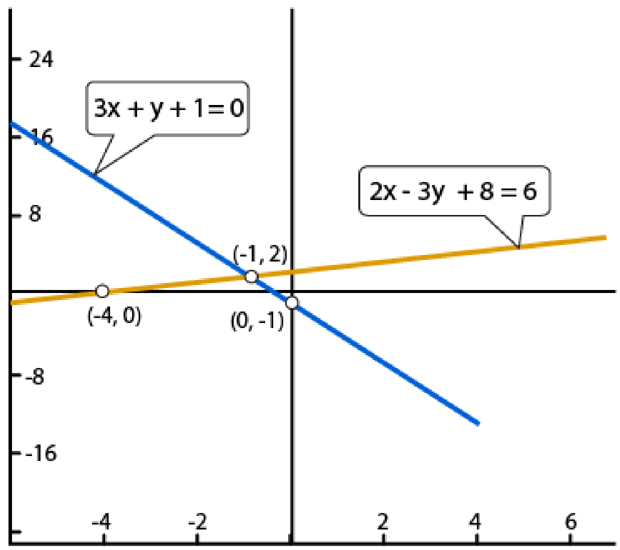
And, when $x = -1$

$\Rightarrow y = (2(-1) + 8)/3 = 2$

Thus we have the following table giving points on the line **2x – 3y + 8 = 0**

x	-4	-1
y	0	2

Graph of the equations (i) and (ii) is as below:



Clearly the two lines intersect at a single point P (-1, 2)

Hence, x= -4 and y = 0

4. 2x + y – 3 = 0

2x – 3y – 7 = 0

Solution:

Given,

2x + y – 3 = 0……. (i)

2x – 3y – 7 = 0……. (ii)

For equation (i),

⇒ y = (3 – 2x)

When x = 0, we have y = (3 – 2(0)) = 3

When x = 1, we have y = (3 – 2(1)) = 1

Thus we have the following table giving points on the line **2x + y – 3 = 0**

x	0	1
y	3	1

For equation (ii),

We solve for y:

⇒ y = (2x – 7)/ 3

So, when x = 2

y = (2(2) – 7)/3 = -1

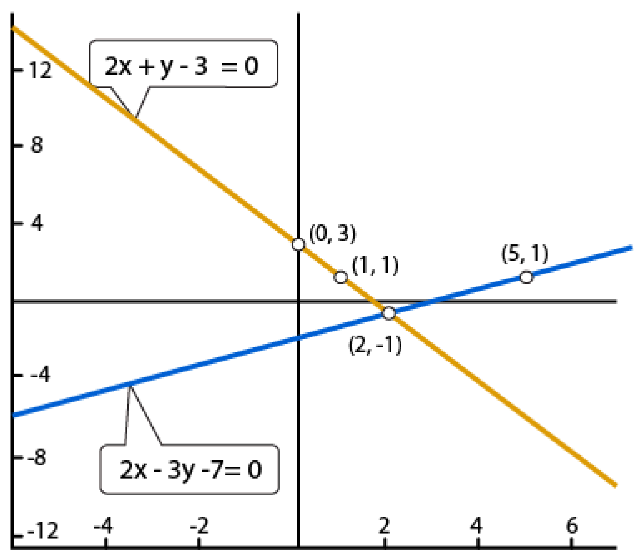
And, when x = 5

⇒ y = (2(5) – 7)/3 = 1

Thus we have the following table giving points on the line **2x – 3y – 7 = 0**

x	2	5
y	-1	1

Graph of the equations (i) and (ii) is as below:



Clearly the two lines intersect at a single point P (2, -1)

Hence, x= 2 and y = -1

5. x + y = 6

x – y = 2

Solution:

Given,

x + y = 6……. (i)

x – y = 2……. (ii)

For equation (i),

⇒ y = (6 – x)

When x = 2, we have y = (6 – 2)) = 4

When x = 3, we have y = (6 – 3) = 3

Thus we have the following table giving points on the line **x + y = 6**

x	2	3
y	4	3

For equation (ii),

We solve for y:

⇒ y = (x – 2)

So, when x = 2

y = (0 – 2) = -2

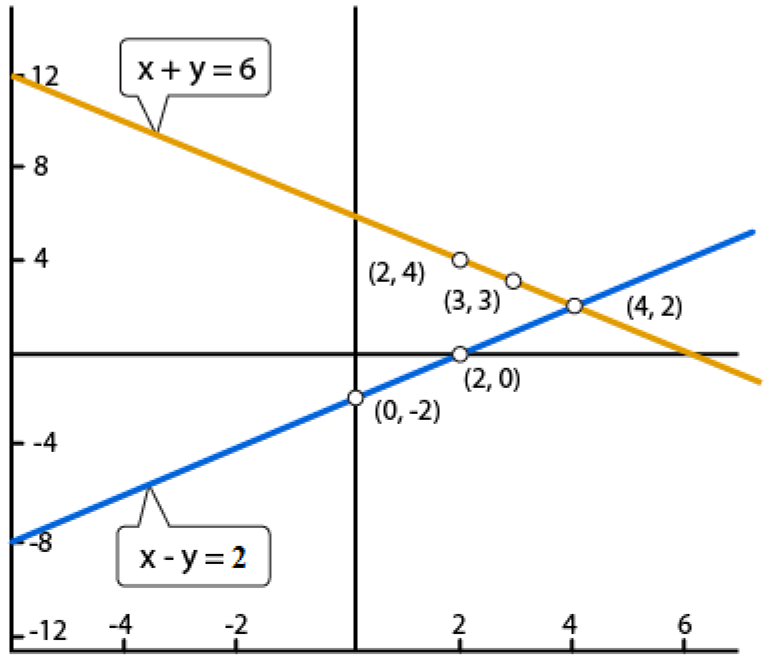
And, when x = 5

⇒ y = (2 – 2) = 0

Thus we have the following table giving points on the line **x – y = 2**

x	0	2
y	-2	0

Graph of the equations (i) and (ii) is as below:



Clearly the two lines intersect at a single point P (4, 2)

Hence, x= 4 and y = 2

6. x – 2y = 6

3x – 6y = 0

Solution:

Given,

x – 2y = 6……. **(i)**

3x – 6y = 0……. **(ii)**

For equation (i),

⇒ y = (x – 6)/2

When x = 2, we have y = (2 – 6)/2 = -2

When x = 0, we have y = (0 – 6)/2 = -3

Thus we have the following table giving points on the line x – 2y = 6

x	2	0
y	-2	-3

For equation (ii),

We solve for y:

⇒ y = x/ 2

So, when x = 0

y = 0/2 = 0

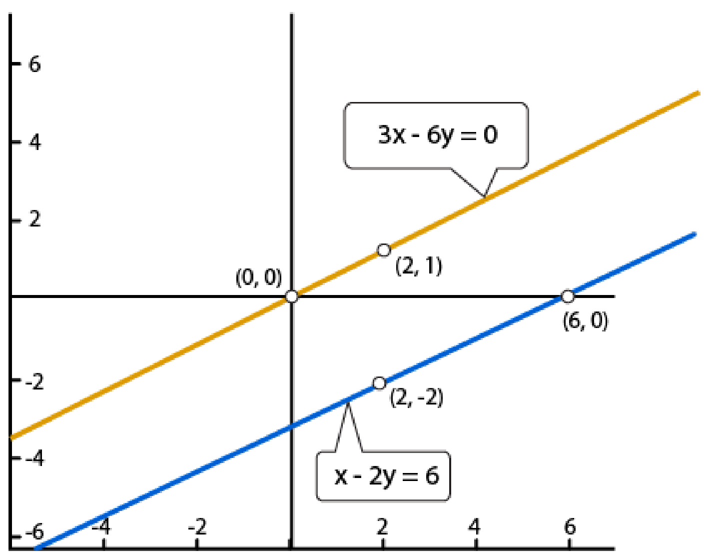
And, when x = 2

⇒ y = 2/2 = 1

Thus we have the following table giving points on the line 3x – 6y = 0

x	0	2
y	0	1

Graph of the equations (i) and (ii) is as below:



Clearly the two lines are parallel to each other. So, the two lines do not intersect.

Hence, the given system has no solutions.

7. x + y = 4

2x – 3y = 3

Solution:

Given,

x + y = 4……. (i)

2x – 3y = 3……. (ii)

For equation (i),

⇒ y = (4 – x)

When x = 4, we have y = (4 – 4) = 0

When x = 2, we have y = (4 – 2) = 2

Thus we have the following table giving points on the line **x + y = 4**

x	4	2
y	0	2

For equation (ii),

We solve for y:

⇒ y = (2x – 3)/3

So, when x = 3

y = (2(3) – 3)/3 = 1

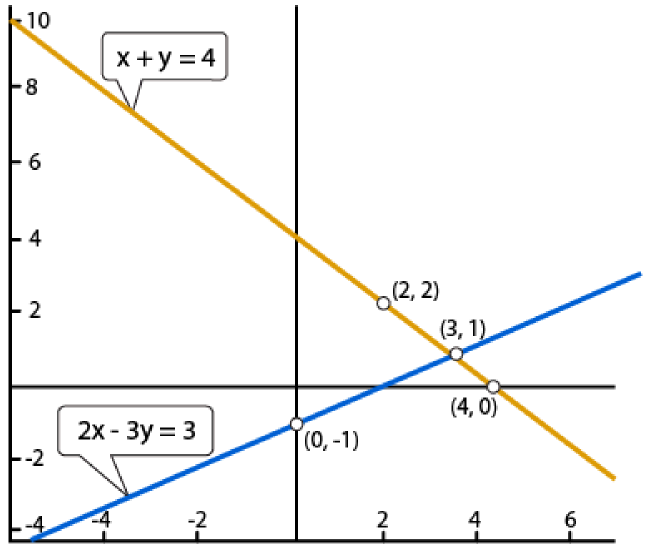
And, when x = 0

⇒ y = (2(0) – 3)/3 = -1

Thus we have the following table giving points on the line **2x – 3y = 3**

x	3	0
y	1	-1

Graph of the equations (i) and (ii) is as below:



Clearly the two lines intersect at a single point P (3, 1)

Hence, x= 3 and y = 1

8. 2x + 3y = 4

x – y + 3 = 0

Solution:

Given,

2x + 3y = 4……. (i)

x – y + 3 = 0……. (ii)

For equation (i),

⇒ y = (4 – 2x) /3

When x = -1, we have y = (4 – 2(-1))/3 = 2

When x = 2, we have y = (4 – 2(2))/3 = 0

Thus we have the following table giving points on the line **2x + 3y = 4**

x	-1	2
y	2	0

For equation (ii),

We solve for y:

⇒ y = (x + 3)

So, when x = 0

y = (0 + 3) = 3

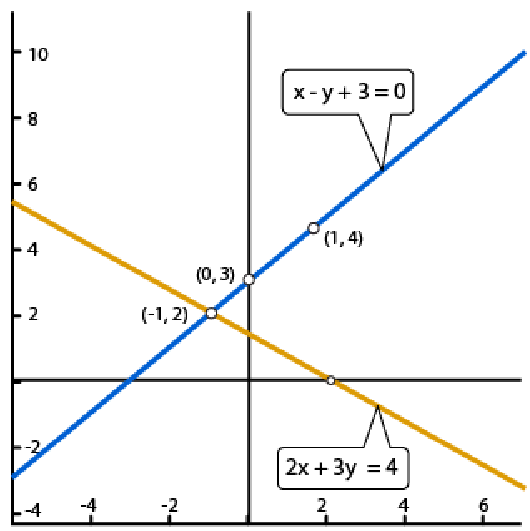
And, when x = 1

⇒ y = (1 + 3) = 4

Thus we have the following table giving points on the line **x – y + 3 = 0**

x	0	1
y	3	4

Graph of the equations (i) and (ii) is as below:



Clearly the two lines intersect at a single point P (-1, 2)

Hence, x= -1 and y = 2

9. 2x – 3y + 13 = 0

3x – 2y + 12 = 0

Solution:

Given,

2x – 3y + 13 = 0……. (i)

3x – 2y + 12 = 0……. (ii)

For equation (i),

⇒ y = (2x + 13) /3

When x = -5, we have y = (2(-5) + 13))/3 = 1

When x = -2, we have y = (2(-2) + 13))/3 = 3

Thus we have the following table giving points on the line **2x – 3y + 13 = 0**

x	-5	-2
y	1	3

For equation (ii),

We solve for y:

⇒ y = (3x + 12)/2

So, when x = -4

y = (3(-4) + 12)/2 = 0

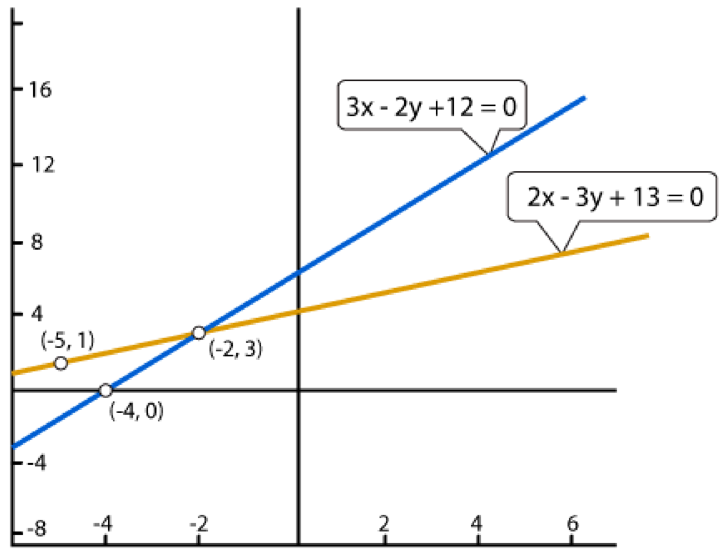
And, when x = -2

⇒ y = (3(-2) + 12)/2 = 3

Thus we have the following table giving points on the line **3x – 2y + 12 = 0**

x	-4	-2
y	0	3

Graph of the equations (i) and (ii) is as below:



Clearly the two lines intersect at a single point P (-2, 3)

Hence, x= -2 and y = 3

10. 2x + 3y + 5 = 0

3x + 2y – 12 = 0

Solution:

Given,

2x + 3y + 5 = 0……. (i)

3x – 2y – 12 = 0……. (ii)

For equation (i),

⇒ y = -(2x + 5) /3

When x = -4, we have y = -(2(-4) + 5))/3 = 1

When x = -2, we have y = -(2(-2) + 5))/3 = -1

Thus we have the following table giving points on the line **2x + 3y + 5 = 0**

x	-4	-1
y	1	-1

For equation (ii),

We solve for y:

⇒ y = (3x – 12)/2

So, when x = 4

y = (3(4) – 12)/2 = 0

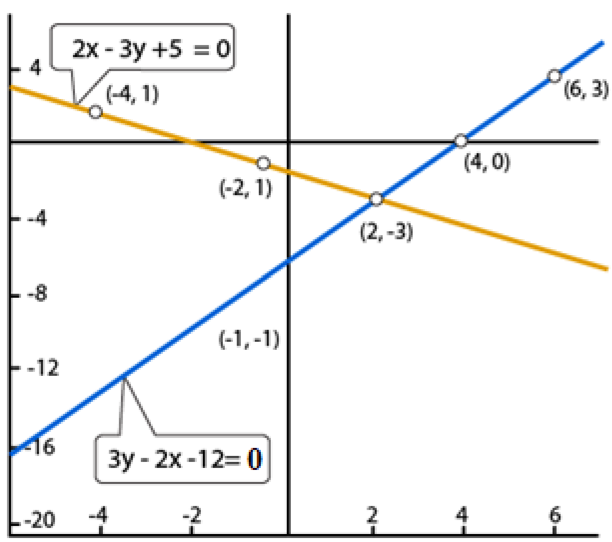
And, when x = 6

⇒ y = (3(6) – 12)/2 = 3

Thus we have the following table giving points on the line **3x – 2y – 12 = 0**

x	4	6
y	0	3

Graph of the equations (i) and (ii) is as below:



Clearly the two lines intersect at a single point P (2, -3)

Hence, x= 2 and y = -3

Show graphically that each one of the following systems of equation has infinitely many solution:

11. 2x + 3y = 6

4x + 6y = 12

Solution:

Given,

2x + 3y = 6……. (i)

4x + 6y = 12……. (ii)

For equation (i),

⇒ y = (6 – 2x) /3

When x = 0, we have y = (6 – 2(0))/3 = 2

When x = 3, we have y = (6 – 2(3))/3 = 0

Thus we have the following table giving points on the line **2x + 3y = 6**

x	0	3
y	2	0

For equation (ii),

We solve for y:

⇒ y = (12 – 4x)/6

So, when x = 0

y = (12 – 4(0))/6 = 2

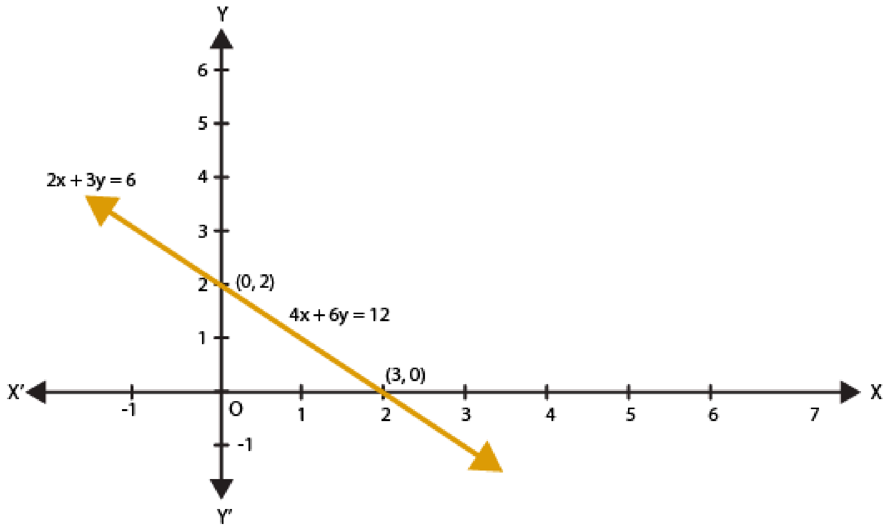
And, when x = 3

⇒ y = (12 – 4(3))/6 = 0

Thus we have the following table giving points on the line **4x + 6y = 12**

x	0	3
y	2	0

Graph of the equations (i) and (ii) is as below:



Thus, the graphs of the two equations are coincident.

Hence, the system of equations has infinitely many solutions.

12. x – 2y = 5

3x – 6y = 15

Solution:

Given,

x – 2y = 5……. (i)

3x – 6y = 15……. (ii)

For equation (i),

⇒ y = (x – 5) /2

When x = 3, we have y = (3 – 5) /2 = -1

When x = 5, we have y = (5 – 5) /2 = 0

Thus we have the following table giving points on the line **x – 2y = 5**

x	3	5
y	-1	0

For equation (ii),

We solve for y:

⇒ y = (3x – 15)/6

So, when x = 1

y = (3(1) – 15)/6= -2

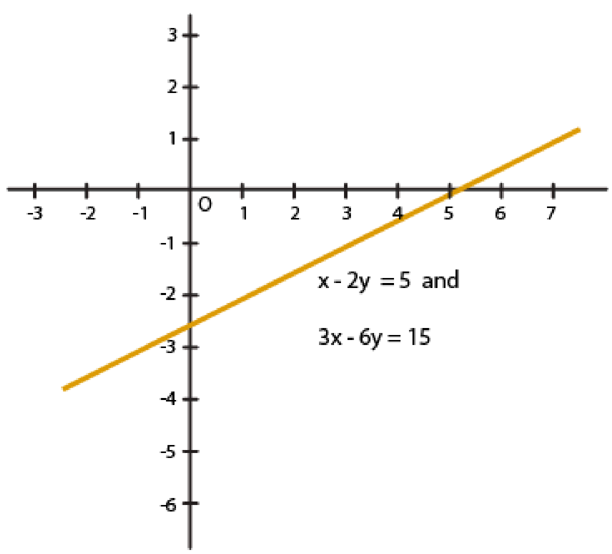
And, when x = -1

⇒ y = (3(-1) – 15)/6= -3

Thus we have the following table giving points on the line **3x – 6y = 15**

x	1	-1
y	-2	-3

Graph of the equations (i) and (ii) is as below:



Thus, the graphs of the two equations are coincident.

Hence, the system of equations has infinitely many solutions.

13. 3x + y = 8

6x + 2y = 16

Solution:

Given,

3x + y = 8……. (i)

6x + 2y = 16……. (ii)

For equation (i),

⇒ y = (8 – 3x)

When x = 2, we have y = (8 – 3(2)) = 2

When x = 3, we have y = (8 – 3(3)) = -1

Thus we have the following table giving points on the line **3x + y = 8**

x	2	3
y	2	-1

For equation (ii),

We solve for y:

⇒ y = (16 – 6x)/2

So, when x = 3

y = (16 – 6(3))/2= -1

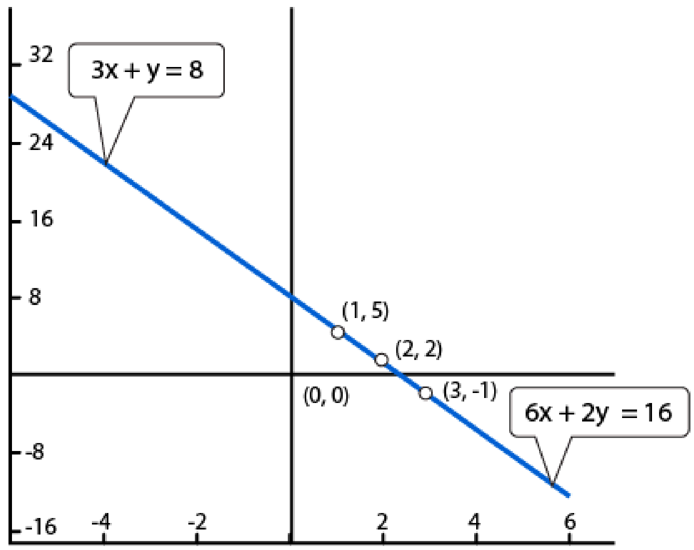
And, when x = 1

⇒ y = (16 – 6(1))/2= 5

Thus we have the following table giving points on the line **6x + 2y = 16**

x	3	1
y	-1	5

Graph of the equations (i) and (ii) is as below:



Thus, the graphs of the two equations are coincident.

Hence, the system of equations has infinitely many solutions.

14. x – 2y + 11 = 0

3x + 6y + 33 = 0

Solution:

Given,

x – 2y + 11 = 0……. (i)

3x – 6y + 33 = 0……. (ii)

For equation (i),

⇒ y = (x + 11)/2

When x = -1, we have y = (-1 + 11)/2 = 5

When x = -3, we have y = (-3 + 11)/2 = 4

Thus we have the following table giving points on the line **x – 2y + 11 = 0**

x	-1	-3
y	5	4

For equation (ii),

We solve for y:

⇒ y = (3x + 33)/6

So, when x = 1

y = (3(1) + 33)/6 = 6

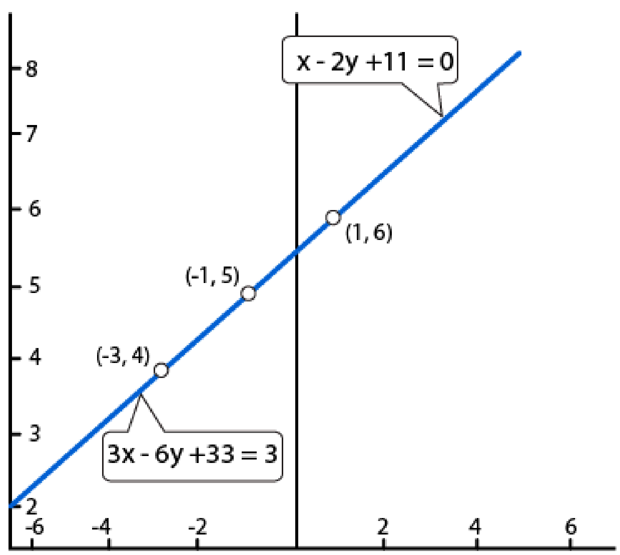
And, when x = -1

⇒ y = (3(-1) + 33)/6 = 5

Thus we have the following table giving points on the line **3x – 6y + 33 = 0**

x	1	-1
y	6	5

Graph of the equations (i) and (ii) is as below:



Thus, the graphs of the two equations are coincident.

Hence, the system of equations has infinitely many solutions.

Show graphically that each one of the following systems of equations is in-consistent (i.e has no solution):

15. 3x – 5y = 20

6x – 10y = – 40

Solution:

Given,

3x – 5y = 20……. (i)

6x – 10y = – 40……. (ii)

For equation (i),

⇒ y = (3x – 20)/5

When x = 5, we have y = (3(5) – 20)/5 = -1

When x = 0, we have y = (3(0) – 20)/5 = -4

Thus we have the following table giving points on the line **3x – 5y = 20**

x	5	0
y	-1	-4

For equation (ii),

We solve for y:

⇒ y = (6x + 40)/10

So, when x = 0

y = (6(0) + 40)/10 = 4

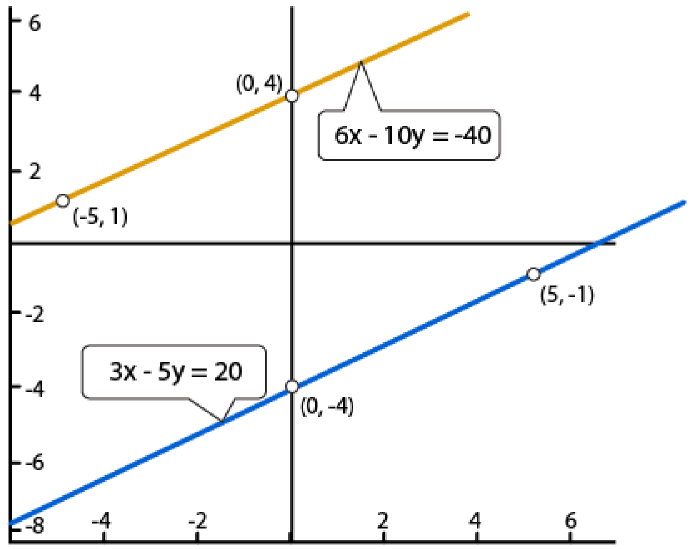
And, when x = -5

⇒ y = (6(-5) + 40)/10 = 1

Thus we have the following table giving points on the line **6x – 10y = – 40**

x	0	-5
y	4	1

Graph of the equations (i) and (ii) is as below:



It is clearly seen that, there is no common point between these two lines.

Hence, the given systems of equations is in-consistent.

16. x – 2y = 6

3x – 6y = 0

Solution:

Given,

x – 2y = 6……. (i)

3x – 6y = 0……. (ii)

For equation (i),

⇒ y = (x – 6)/2

When x = 6, we have y = (6 – 6)/2 = 0

When x = 2 we have y = (2 – 6)/2 = -2

Thus we have the following table giving points on the line **x – 2y = 6**

x	6	2

y	0	-2

For equation (ii),

We solve for y:

⇒ y = x/2

So, when x = 0

y = 0/2 = 0

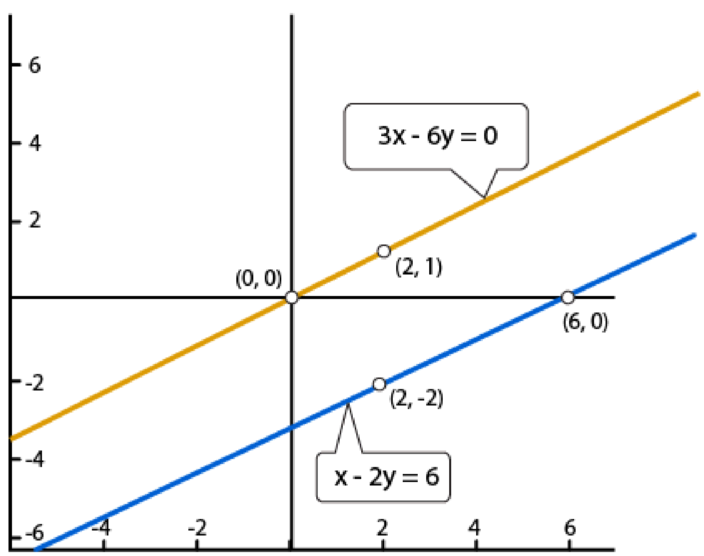
And, when x = 2

⇒ y = 2/2 = 1

Thus we have the following table giving points on the line **3x – 6y = 0**

x	0	2
y	0	1

Graph of the equations (i) and (ii) is as below:



It is clearly seen that, there is no common point between these two lines.

Hence, the given systems of equations is in-consistent.

17. 2y – x = 9

6y – 3x = 21

Solution:

Given,

2y – x = 9**……. (i)**

6y – 3x = 21……. (ii)

For equation (i),

⇒ y = (x + 9)/2

When x = -3, we have y = (-3 + 9)/2= 3

When x = -1, we have y = (-1 + 9)/2= 4

Thus we have the following table giving points on the line 2y – x = 9

x	-3	-1
y	3	4

For equation (ii),

We solve for y:

⇒ y = (21 + 3x)/6

So, when x = -3

y = (21 + 3(-3))/6 = 2

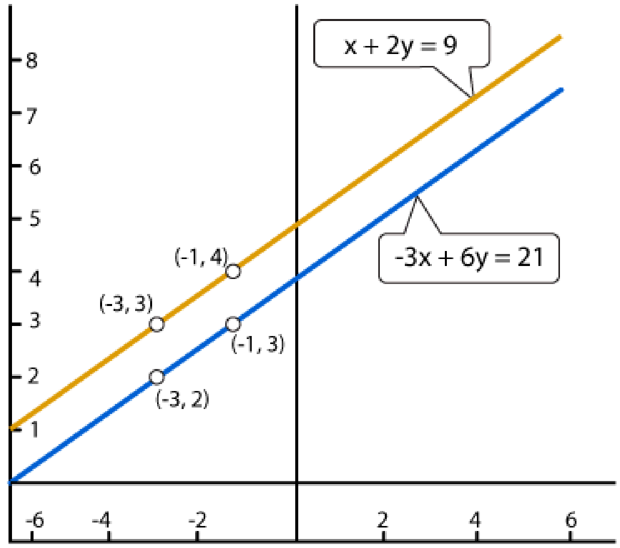
And, when x = -1

⇒ y = (21 + 3(-1))/6 = 3

Thus we have the following table giving points on the line **6y – 3x = 21**

x	-3	-1
y	2	3

Graph of the equations (i) and (ii) is as below:



It is clearly seen that, there is no common point between these two lines.

Hence, the given systems of equations is in-consistent.

18. 3x – 4y – 1 = 0

2x – (8/3)y + 5 = 0

Solution:

Given,

3x – 4y – 1 = 0……. (i)

2x – (8/3)y + 5 = 0**……. (ii)**

For equation (i),

⇒ y = (3x – 1)/4

When x = -1, we have y = (3(-1) – 1)/4= -1

When x = 3, we have y = (3(3) – 1)/4= 2

Thus we have the following table giving points on the line **3x – 4y – 1 = 0**

x	-1	3
y	-1	2

For equation (ii),

We solve for y:

⇒ $y = (6x + 15)/8$

So, when $x = -2.5$

$y = (6(-2.5) + 15)/8 = 0$

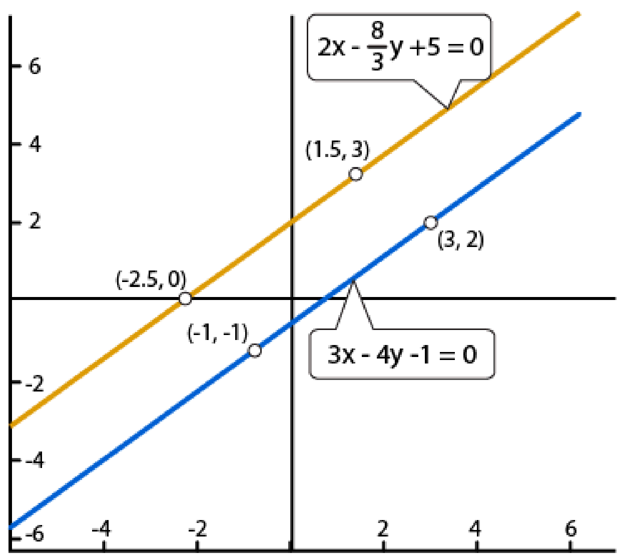
And, when $x = 1.5$

⇒ $y = (6(1.5) + 15)/8 = 3$

Thus we have the following table giving points on the line $2x - (8/3)y + 5 = 0$

x	-2.5	1.5
y	0	3

Graph of the equations (i) and (ii) is as below:



It is clearly seen that, there is no common point between these two lines.

Hence, the given systems of equations is in-consistent.

19. Determine graphically the vertices of the triangle, the equations of whose sides are given below:

(i) 2y – x = 8, 5y – x = 14 and y – 2x = 1

Solution:

Given,

2y – x = 8……. (i)

5y – x = 14……. (ii)

y – 2x = 1……… (iii)

For equation (i),

⇒ y = (x + 8)/2

When x = -4, we have y = (-4 + 8)/2 = 2

When x = 0, we have y = (0 + 8)/2 = 4

Thus we have the following table giving points on the line **2y – x = 8**

x	-4	0
y	2	4

For equation (ii),

We solve for y:

⇒ y = (x + 14)/5

So, when x = -4

y = ((-4) + 14)/5= 2

And, when x = 1

⇒ y = (1 + 14)/5= 3

Thus we have the following table giving points on the line **5y – x = 14**

x	-4	1
y	2	3

Finally, for equation (iii),

⇒ y = (2x + 1)

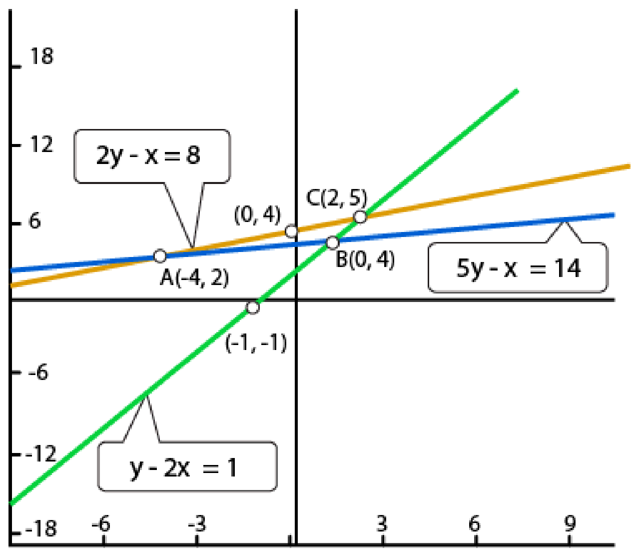
When x = -1, we have y = (2(-1) + 1) = -1

When x = 1, we have y = (2(1) + 1) = 3

Thus we have the following table giving points on the line **y – 2x = 1**

x	-1	1
y	1	3

Graph of the equations (i), (ii) and (iii) is as below:



From the above graph, we observe that the lines taken in pairs intersect at points A(-4,2), B(1,3) and C(2,5)

Hence the vertices of the triangle are A(-4, 2), B(1, 3) and C(2,5)

(ii) y = x, y = 0 and 3x + 3y = 10

Solution:

Given,

y = x ……. (i)

y = 0 ……. (ii)

3x + 3y = 10……… (iii)

For equation (i),

When x = 1, we have y = 1

When x = -2, we have y = -2

Thus we have the following table giving points on the line **y = x**

x	1	-2
y	1	-2

For equation (ii),

When x = 0

y = 0

And, when x = 10/3

⇒ y = 0

Thus we have the following table giving points on the line **y = 0**

x	0	10/3
y	0	10/3

Finally, for equation (iii),

⇒ y = (10 – 3x)/3

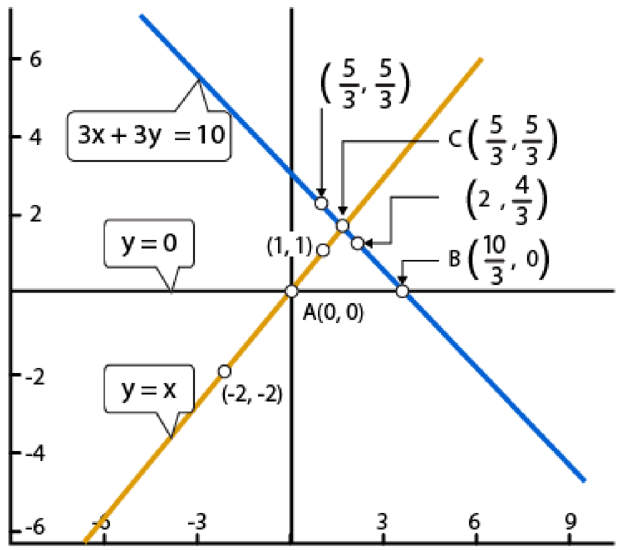
When x = 1, we have y = (10 – 3(1))/3) = 7/3

When x = 2, we have y = (10 – 3(2))/3 = 4/3

Thus we have the following table giving points on the line **3x + 3y = 10**

x	1	2
y	7/3	4/3

Graph of the equations (i), (ii) and (iii) is as below:



From the above graph, we observe that the lines taken in pairs intersect at points A(0,0) B(10/3,0) and C(5/3, 5/3)

Hence the vertices of the triangle are A(0,0) B(10/3,0) and C(5/3, 5/3).

20. Determine graphically whether the system of equations x – 2y = 2, 4x – 2y = 5 is consistent or in-consistent.

Solution:

Given,

x – 2y = 2……. (i)

4x – 2y = 5……. (ii)

For equation (i),

⇒ y = (x – 2)/2

When x = 2, we have y = (2 – 2)/2 = 0

When x = 0, we have y = (0 – 2)/2 = -1

Thus we have the following table giving points on the line **x – 2y = 2**

x	2	0

y	0	-1

For equation (ii),

We solve for x:

⇒ x = (5 + 2y)/4

So, when y = 0

x = (5 + 2(0))/4 = 5/4

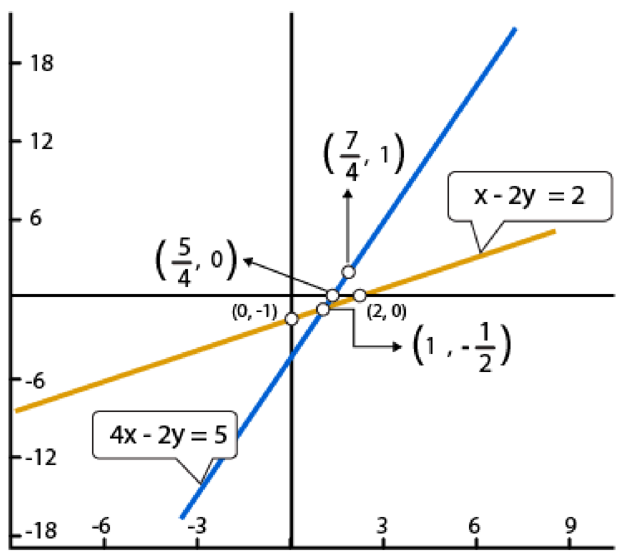
And, when y = 1.5

⇒ x = (5 + 2(1))/4 = 7/4

Thus we have the following table giving points on the line **4x – 2y = 5**

x	5/4	7/4
y	0	1

Graph of the equations (i) and (ii) is as below:



It is clearly seen that the two lines intersect at (1,0)

Hence, the system of equations is consistent.

21. Determine by drawing graphs, whether the following system of linear equation has a unique solution or not:

(i) 2x – 3y = 6 and x + y = 1

Solution:

Given,

2x – 3y = 6 ……. (i)

x + y = 1……. (ii)

For equation (i),

⇒ y = (2x – 6)/3

When x = 3, we have y = (2(3) – 6)/3= 0

When x = 0, we have y = (2(0) – 6)/3= -2

Thus we have the following table giving points on the line **2x – 3y = 6**

x	3	0
y	0	-2

For equation (ii),

We solve for y:

⇒ y = (1 – x)

So, when x = 0

y = (1 – 0) = 1

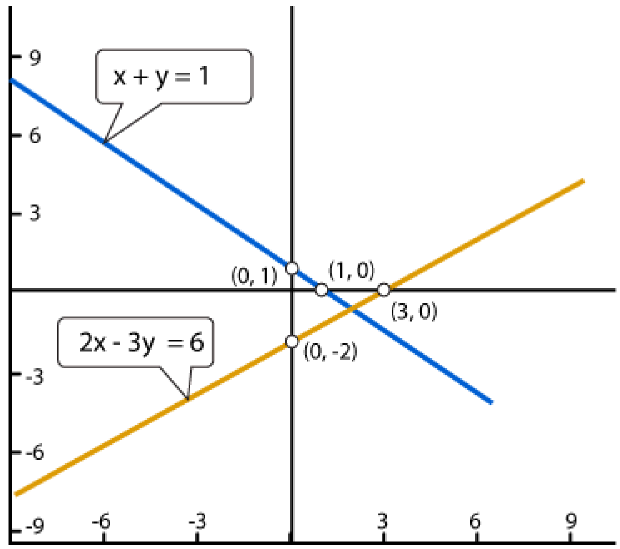
And, when x = 1

⇒ y = (1 – 1) = 0

Thus we have the following table giving points on the line **x + y = 1**

x	0	1
y	1	0

Graph of the equations (i) and (ii) is as below:



It’s seen clearly that the two lines intersect at one.

Thus, we can conclude that the system of equations has a unique solution.

(ii) 2y = 4x – 6 and 2x = y + 3

Solution:

Given,

2y = 4x – 6……. (i)

2x = y + 3……. (ii)

For equation (i),

⇒ y = (4x – 6)/2

When x = 1, we have y = (4(1) – 6)/2 = -1

When x = 4, we have y = (4(4) – 6)/2= 5

Thus we have the following table giving points on the line **2y = 4x – 6**

x	1	4
y	-1	5

For equation (ii),

We solve for y:

⇒ $y = 2x - 3$

So, when $x = 2$

$y = 2(2) - 3 = 1$

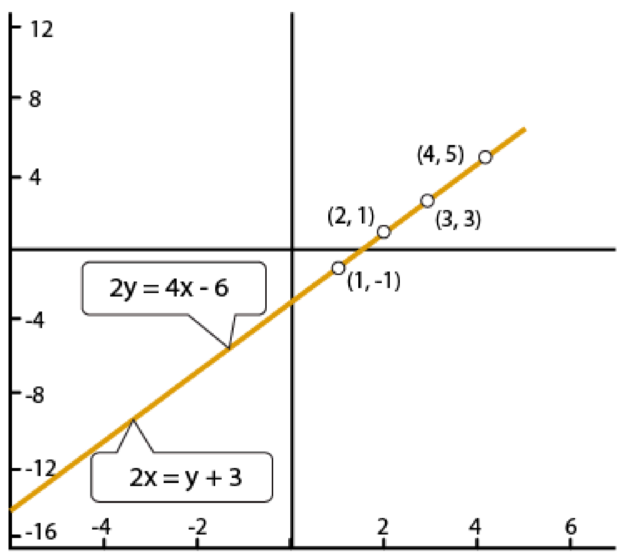
And, when $x = 3$

⇒ $y = 2(3) - 3 = 3$

Thus we have the following table giving points on the line **2x = y + 3**

x	2	3
y	1	3

Graph of the equations (i) and (ii) is as below:



We see that the two lines are coincident. And, hence it has infinitely many solutions.

Therefore, the system of equations does not have a unique solution.

Benefits of Solving RD Sharma Solutions Class 10 Maths Chapter 3 Exercise 3.2

Solving RD Sharma Solutions for Class 10 Maths Chapter 3, Exercise 3.2 offers several benefits:

Strengthens Algebraic Skills: It helps students master the substitution method to solve linear equations, building confidence in algebra.

Improves Problem-Solving Abilities: Working through these equations enhances logical thinking, as students learn to rearrange equations and find variable values.

Foundation for Advanced Mathematics: Understanding linear equations in two variables is essential for tackling advanced topics in calculus, coordinate geometry, and physics.

Real-World Applications: These equations model real-world problems, helping students relate mathematical concepts to practical scenarios.

Prepares for Exams: Practicing RD Sharma’s structured problems sharpens skills required for board exams and other competitive tests.