NCERT Solutions for Class 10 Maths Chapter 3 Exercise 3.6: Exercise 3.6 of Chapter 3 Pair of Linear Equations in Two Variables helps students practice solving real-life word problems using linear equations. The exercise involves forming equations from given situations, then solving them using algebraic methods such as substitution or elimination.

By applying these methods students learn how to translate word problems into mathematical equations and find solutions that are relevant to the problem's context. The NCERT Solutions for Exercise 3.6 provide clear, step-by-step explanations and guide students through the process of solving each problem. This exercise is essential for developing strong problem-solving skills and preparing for exams, where word problems often appear.

NCERT Solutions for Class 10 Maths Chapter 3 Exercise 3.6 Overview

Exercise 3.6 of Chapter 3 Pair of Linear Equations in Two Variables focuses on solving real-life word problems using linear equations. In this exercise, students are presented with practical scenarios where they need to form linear equations based on the given information, and then solve them using algebraic methods such as substitution or elimination.

Forming Equations from Word Problems:

- Students must first understand the problem and extract relevant data to form linear equations in two variables.
- These problems often involve concepts such as age, distance, time, cost, and other relatable real-world situations.

Solving Using Algebraic Methods:

- After forming the equations, students solve them using substitution or elimination, which are fundamental techniques for solving linear systems.

NCERT Solutions for Class 10 Maths Chapter 3 Exercise 3.6 PDF

The NCERT Solutions for Exercise 3.6 in Chapter 3 help students master the process of solving word problems that require linear equations in two variables. This exercise provide step-by-step guidance on how to approach and solve such problems effectively.

By referring to this PDF students can strengthen their problem-solving skills and gain confidence in handling mathematical situations. The complete PDF with all solutions is available below for reference.

NCERT Solutions for Class 10 Maths Chapter 3 Pair of Linear Equations in Two Variables Exercise 3.6

Here is the NCERT Class 10 Chapter 3 Pair of Linear Equations in Two Variables Exercise 3.6-

1. Solve the following pairs of equations by reducing them to a pair of linear equations:

(i) 1/2x + 1/3y = 2

1/3x + 1/2y = 13/6

Solution:

Let us assume 1/x = m and 1/y = n, then the equation will change as follows.

m/2 + n/3 = 2

⇒ 3m+2n-12 = 0…….(1)

m/3 + n/2 = 13/6

⇒ 2m+3n-13 = 0…….(2)

Now, using the cross-multiplication method, we get,

m/(-26-(-36)) = n/(-24-(-39)) = 1/(9-4)

m/10 = n/15 = 1/5

m/10 = 1/5 and n/15 = 1/5

So, m = 2 and n = 3

1/x = 2 and 1/y = 3

x = 1/2 and y = 3

(ii) 2/√x + 3/√y = 2

4/√x + 9/√y = -1

Solution:

Substituting 1/√x = m and 1/√y = n in the given equations, we get

2m + 3n = 2 ……..(i)

4m – 9n = -1 ……(ii)

Multiplying equation (i) by 3, we get

6m + 9n = 6 ……..…..(iii)

Adding equations (ii) and (iii), we get

10m = 5

m = 1/2……..…(iv)

Now, by putting the value of ‘m’ in equation (i), we get

2×1/2 + 3n = 2

3n = 1

n = 1/3

m =1/√x

½ = 1/√x

x = 4

n = 1/√y

1/3 = 1/√y

y = 9

Hence, x = 4 and y = 9

(iii) 4/x + 3y = 14

3/x -4y = 23

Solution:

Putting in the given equation, we get,

So, 4m + 3y = 14 => 4m + 3y – 14 = 0 ……..…...(1)

3m – 4y = 23 => 3m – 4y – 23 = 0 ……(2)

By cross-multiplication, we get,

m/(-69-56) = y/(-42-(-92)) = 1/(-16-9)

-m/125 = y/50 = -1/ 25

-m/125 = -1/25 and y/50 = -1/25

m = 5 and b = -2

m = 1/x = 5

So , x = 1/5

y = -2

(iv) 5/(x-1) + 1/(y-2) = 2

6/(x-1) – 3/(y-2) = 1

Solution:

Substituting 1/(x-1) = m and 1/(y-2) = n in the given equations, we get

5m + n = 2 ……(i)

6m – 3n = 1 …….(ii)

Multiplying equation (i) by 3, we get

15m + 3n = 6 …….(iii)

Adding (ii) and (iii), we get

21m = 7

m = 1/3

Putting this value in equation (i), we get

5×1/3 + n = 2

n = 2- 5/3 = 1/3

m = 1/ (x-1)

⇒ 1/3 = 1/(x-1)

⇒ x = 4

n = 1/(y-2)

⇒ 1/3 = 1/(y-2)

⇒ y = 5

Hence, x = 4 and y = 5

(v) (7x-2y)/ xy = 5

(8x + 7y)/xy = 15

Solution:

(7x-2y)/ xy = 5

7/y – 2/x = 5……..(i)

(8x + 7y)/xy = 15

8/y + 7/x = 15……(ii)

Substituting 1/x =m in the given equation, we get

– 2m + 7n = 5 => -2 + 7n – 5 = 0 ……..(iii)

7m + 8n = 15 => 7m + 8n – 15 = 0 ……(iv)

By cross-multiplication method, we get

m/(-105-(-40)) = n/(-35-30) = 1/(-16-49)

m/(-65) = n/(-65) = 1/(-65)

m/-65 = 1/-65

m = 1

n/(-65) = 1/(-65)

n = 1

m = 1 and n = 1

m = 1/x = 1 n = 1/x = 1

Therefore, x = 1 and y = 1

(vi) 6x + 3y = 6xy

2x + 4y = 5xy

Solution:

6x + 3y = 6xy

6/y + 3/x = 6

Let 1/x = m and 1/y = n

=> 6n +3m = 6

=>3m + 6n-6 = 0…….(i)

2x + 4y = 5xy

=> 2/y + 4/x = 5

=> 2n +4m = 5

=> 4m+2n-5 = 0……..(ii)

3m + 6n – 6 = 0

4m + 2n – 5 = 0

By cross-multiplication method, we get

m/(-30 –(-12)) = n/(-24-(-15)) = 1/(6-24)

m/-18 = n/-9 = 1/-18

m/-18 = 1/-18

m = 1

n/-9 = 1/-18

n = 1/2

m = 1 and n = 1/2

m = 1/x = 1 and n = 1/y = 1/2

x = 1 and y = 2

Hence, x = 1 and y = 2

(vii) 10/(x+y) + 2/(x-y) = 4

15/(x+y) – 5/(x-y) = -2

Solution:

Substituting 1/x+y = m and 1/x-y = n in the given equations, we get

10m + 2n = 4 => 10m + 2n – 4 = 0 ……..…..(i)

15m – 5n = -2 => 15m – 5n + 2 = 0 ……..(ii)

Using the cross-multiplication method, we get

m/(4-20) = n/(-60-(20)) = 1/(-50 -30)

m/-16 = n/-80 = 1/-80

m/-16 = 1/-80 and n/-80 = 1/-80

m = 1/5 and n = 1

m = 1/(x+y) = 1/5

x+y = 5 ……(iii)

n = 1/(x-y) = 1

x-y = 1……(iv)

Adding equations (iii) and (iv), we get

2x = 6 => x = 3 …….(v)

Putting the value of x = 3 in equation (3), we get

y = 2

Hence, x = 3 and y = 2

(viii) 1/(3x+y) + 1/(3x-y) = 3/4

1/2(3x+y) – 1/2(3x-y) = -1/8

Solution:

Substituting 1/(3x+y) = m and 1/(3x-y) = n in the given equations, we get

m + n = 3/4 …… (1)

m/2 – n/2 = -1/8

m – n = -1/4 ……..…(2)

Adding (1) and (2), we get

2m = 3/4 – 1/4

2m = 1/2

Putting in (2), we get

1/4 – n = -1/4

n = 1/4 + 1/4 = 1/2

m = 1/(3x+y) = 1/4

3x + y = 4 ……(3)

n = 1/(3x-y) = 1/2

3x – y = 2 ……(4)

Adding equations (3) and (4), we get

6x = 6

x = 1 …….(5)

Putting in (3), we get

3(1) + y = 4

y = 1

Hence, x = 1 and y = 1

2. Formulate the following problems as a pair of equations and find their solutions.

(i) Ritu can row downstream 20 km in 2 hours and upstream 4 km in 2 hours. Find her speed of rowing in still water and the speed of the current.

(ii) 2 women and 5 men can together finish an embroidery work in 4 days, while 3 women and 6 men can finish it in 3 days. Find the time taken by 1 woman alone to finish the work and also that taken by 1 man alone.

(iii) Roohi travels 300 km to her home partly by train and partly by bus. She takes 4 hours if she travels 60 km by train and the remaining by bus. If she travels 100 km by train and the remaining by bus, she takes 10 minutes longer. Find the speed of the train and the bus separately.

Solutions:

(i) Let us consider,

Speed of Ritu in still water = x km/hr

Speed of Stream = y km/hr

Now, the speed of Ritu during

Downstream = x + y km/h

Upstream = x – y km/h

As per the question given,

2(x+y) = 20

Or x + y = 10…….(1)

And, 2(x-y) = 4

Or x – y = 2……(2)

Adding both the eq.1 and 2, we get

2x = 12

x = 6

Putting the value of x in eq.1, we get

y = 4

Therefore,

Speed of Ritu rowing in still water = 6 km/hr

Speed of Stream = 4 km/hr

(ii) Let us consider,

Number of days taken by women to finish the work = x

Number of days taken by men to finish the work = y

Work done by women in one day = 1/x

Work done by women in one day = 1/y

As per the question given,

$4(2/x + 5/y) = 1$

$(2/x + 5/y) = 1/4$

And, $3(3/x + 6/y) = 1$

$(3/x + 6/y) = 1/3$

Now, put $1/x=m$ and $1/y=n$, we get,

$2m + 5n = 1/4 \Rightarrow 8m + 20n = 1$……(1)

$3m + 6n = 1/3 \Rightarrow 9m + 18n = 1$…….(2)

Now, by cross multiplication method, we get here,

$m/(20-18) = n/(9-8) = 1/ (180-144)$

$m/2 = n/1 = 1/36$

$m/2 = 1/36$

$m = 1/18$

$m = 1/x = 1/18$

or $x = 18$

$n = 1/y = 1/36$

$y = 36$

Therefore,

Number of days taken by women to finish the work = 18

Number of days taken by men to finish the work = 36

(iii) Let us consider,

Speed of the train = x km/h

Speed of the bus = y km/h

According to the given question,

$60/x + 240/y = 4$ ……(1)

$100/x + 200/y = 25/6$ …….(2)

Put $1/x=m$ and $1/y=n$ in the above two equations.

$60m + 240n = 4$……..(3)

$100m + 200n = 25/6$

$600m + 1200n = 25$ …….(4)

Multiply eq.3 by 10 to get

$600m + 2400n = 40$ ……(5)

Now, subtract eq.4 from 5 to get

$1200n = 15$

$n = 15/1200 = 1/80$

Substitute the value of n in eq. 3 to get

$60m + 3 = 4$

$m = 1/60$

$m = 1/x = 1/60$

$x = 60$

And $y = 1/n$

y = 80

Therefore,

Speed of the train = 60 km/h

Speed of the bus = 80 km/h

Tips and Tricke to Solve NCERT Solutions for Class 10 Maths Chapter 3 Exercise 3.6

- **Understand the Problem Thoroughly**: Before jumping to form equations, read the word problem carefully and highlight the key data points. Identify the variables and the relationship between them. Understanding the context will help you translate the problem into mathematical equations.
- **Define Variables Clearly**: Always define your variables clearly at the beginning. For example, let x represent the number of apples and y represent the number of oranges. This makes it easier to create equations and avoid confusion later.
- **Form the Correct Equations**: Translate the given information into linear equations. Look for phrases like "in total," "combined," or "difference" to form appropriate equations. Ensure that the equation reflects the actual relationships from the problem.
- **Choose the Right Method**: Depending on the problem, you can solve the system of equations using either substitution or elimination. If one equation is easily solvable for one variable, use substitution. If the coefficients of variables are easy to eliminate, use the elimination method.
- **Check the Solutions**: After solving the equations, always substitute the values of the variables back into the original problem to check if they satisfy both equations. This ensures the solution is correct.
- **Practice Regularly**: Solving more problems will improve your ability to quickly form equations and select the right method of solving. The more problems you practice, the better you will become at recognizing patterns and solving them efficiently.
- **Work Step by Step**: Break down the problem into smaller steps and solve each step carefully. Avoid skipping steps to ensure you don't miss any important calculations. Show your work clearly in the solution to avoid mistakes.
- **Focus on Units and Interpretations**: Pay attention to the units and the meaning of your solution. Always ensure that the final answer makes sense in the context of the problem (e.g., if you're solving for the number of people, your answer shouldn't be negative or fractional).