

Maharashtra Board Solutions Class 9-Maths (Part 1): Chapter 5.1- Linear Equations in Two Variables

BOOK SOLUTIONS
CLASS 9
MATHS

CHAPTER 5.1
**Linear Equations in Two
Variables**

Maharashtra Board Solutions→






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Maharashtra Board Solutions Class 9-Maths (Part 1): Chapter 5.1- Linear Equations in Two Variables

Class 9: Maths Chapter 5.1 solutions. Complete Class 9 Maths Chapter 5.1 Notes.

Maharashtra Board Solutions Class 9-Maths (Part 1): Chapter 5.1- Linear Equations in Two Variables

Maharashtra Board 9th Maths Chapter 5.1, Class 9 Maths Chapter 5.1 solutions

Question 1.

By using variables x and y form any five linear equations in two variables.

Answer:

The general form of a linear equation in two variables x and y is $ax + by + c = 0$,

where a, b, c are real numbers and $a \neq 0, b \neq 0$.

Five linear equations in two variables are as follows:

i. $3x + 4y - 12 = 0$

ii. $3x - 4y + 12 = 0$

iii. $5x + 5y - 6 = 0$

iv. $7x + 12y - 11 = 0$

v. $x - y + 5 = 0$

Question 2.

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Write five solutions of the equation $x + y = 1$.

Answer:

i. $x = 1, y = 6$

ii. $x = -1, y = 8$

iii. $x = 5, y = 2$

iv. $x = 0, y = 7$

v. $x = 10, y = -3$

Question 3.

Solve the following sets of simultaneous equations.

i. $x + y = 4$; $2x - 5y = 1$

ii. $2x + y = 5$; $3x - y = 5$

iii. $3x - 5y = 16$; $x - 3y = 8$

iv. $2y - x = 0$; $10x + 15y = 105$

v. $2x + 3y + 4 = 0$; $x - 5y = 11$

vi. $2x - 7y = 7$; $3x + y = 22$

Solution:

i. Substitution Method:

$$x + y = 4$$

$$\therefore x = 4 - y \dots(i)$$

$$2x - 5y = 1 \dots(ii)$$

Substituting $x = 4 - y$ in equation (ii),

$$2(4 - y) - 5y = 1$$

$$\therefore 8 - 2y - 5y = 1$$

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$$\therefore 8 - 7y = 1$$

$$\therefore 8 - 1 = 7y$$

$$\therefore 7 = 7y$$

$$\therefore y = 1$$

$$\therefore y = 1$$

Substituting $y = 1$ in equation (i),

$$x = 4 - 1 = 3$$

$\therefore (3,1)$ is the solution of the given equations.

Alternate method:

Elimination Method:

$$x + y = 4 \dots(i)$$

$$2x - 5y = 1 \dots(ii)$$

Multiplying equation (i) by 5,

$$5x + 5y = 20 \dots (iii)$$

Adding equations (ii) and (iii),

$$2x - 5y = 1$$

$$+ 5x + 5y = 20$$

$$7 = 21$$

$$\therefore x = 217$$

$$\therefore x = 3$$

Substituting $x = 3$ in equation (i),

$$3 + y = 4$$

$$\therefore y = 4 - 3 = 1$$

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(3,1) is the solution of the given equations.

ii. $2x + y = 5$...(i)

$3x - y = 5$...(ii)

Adding equations (i) and (ii),

$$2x + y = 5$$

$$+ 3x - y = 5$$

$$5x = 10$$

$$\therefore x = 105$$

$$\therefore x = 2$$

Substituting $x = 2$ in equation (i),

$$2(2) + y = 5$$

$$4 + y = 5$$

$$\therefore y = 5 - 4 = 1$$

$\therefore (2, 1)$ is the solution of the given equations.

iii. $3x - 5y = 16$...(i)

$$x - 3y = 8$$

$$\therefore x = 8 + 3y$$
 ...(ii)

Substituting $x = 8 + 3y$ in equation (i),

$$3(8 + 3y) - 5y = 16$$

$$24 + 9y - 5y = 16$$

$$\therefore 4y = 16 - 24$$

$$\therefore 4y = -8$$

$$\therefore y = -84$$

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$$y = -2$$

Substituting $y = -2$ in equation (ii),

$$x = 8 + 3(-2)$$

$$\therefore x = 8 - 6 = 2$$

$\therefore (2, -2)$ is the solution of the given equations.

iv. $2y - x = 0$

$$\therefore x = 2y \dots(i)$$

$$10x + 15y = 105 \dots(ii)$$

Substituting $x = 2y$ in equation (ii),

$$10(2y) + 15y = 105$$

$$\therefore 20y + 15y = 105$$

$$\therefore 35y = 105$$

$$\therefore y = 105/35$$

$$\therefore y = 3$$

Substituting $y = 3$ in equation (i),

$$x = 2y$$

$$\therefore x = 2(3) = 6$$

$\therefore (6, 3)$ is the solution of the given equations.

v. $2x + 3y + 4 = 0 \dots(i)$

$$x - 5y = 11$$

$$\therefore x = 11 + 5y \dots(ii)$$

Substituting $x = 11 + 5y$ in equation (i),

$$2(11 + 5y) + 3y + 4 = 0$$

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$$\therefore 22 + 10y + 3y + 4 = 0$$

$$\therefore 13y + 26 = 0$$

$$\therefore 13y = -26$$

$$\therefore y = -2613$$

$$\therefore y = -2$$

Substituting $y = -2$ in equation (ii),

$$x = 11 + 5y$$

$$\therefore x = 11 + 5(-2)$$

$$\therefore x = 11 - 10 = 1$$

$\therefore (1, -2)$ is the solution of the given equations.

vi. $2x - 7y = 7 \dots(i)$

$$3x + y = 22$$

$$\therefore y = 22 - 3x \dots\dots(ii)$$

Substituting $y = 22 - 3x$ in equation (i),

$$2x - 7(22 - 3x) = 7$$

$$\therefore 2x - 154 + 21x = 7$$

$$\therefore 23x = 7 + 154$$

$$\therefore 23x = 161$$

$$\therefore x = 16123$$

$$\therefore x = 7$$

Substituting $x = 7$ in equation (ii),

$$y = 22 - 3x$$

$$\therefore y = 22 - 3(7)$$

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$$\therefore 7 = 22 - 21 = 1$$

$\therefore (7, 1)$ is the solution of the given equations.

Question 1.

Solve the following equations. (Textbook pg. no. 80)

i. $m + 3 = 5$

ii. $3y + 8 = 22$

iii. $x3 = 2$

iv. $2p = p + 49$

Solution:

i. $m + 3 = 5$

$$m = 5 - 3$$

$$\therefore m = 2$$

ii. $3y + 8 = 22$

$$\therefore 3y = 22 - 8$$

$$\therefore 3y = 14$$

$$\therefore y = 149$$

iii. $x3 = 2$

$$\therefore x = 2 \times 3$$

$$\therefore x = 6$$

iv. $2p = p + 49$

$$\therefore 2p - p = 49$$

$$\therefore p = 49$$

Question 2.

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Which number should be added to 5 to obtain 14? (Textbook pg. no. 80)

Solution:

$$x + 5 = 14$$

$$\therefore x = 14 - 5$$

$$x = 9$$

$$\therefore 9 + 5 = 14$$

Question 3.

Which number should be subtracted from 8 to obtain 2? (Textbook pg. no. 80)

Solution:

$$8 - y = 2$$

$$\therefore y = 8 - 2$$

$$\therefore y = 6$$

$$\therefore 8 - 6 = 2$$

Question 4.

$x + y = 5$ and $2x + 2y = 10$ are two equations in two variables. Find live different solutions of $x + y = 5$, verify whether same solutions satisfy the equation $2x + 2y = 10$ also. Observe both equations. Find the condition where two equations in two variables have all solutions in common. (Textbook pg. no. 82)

Solution:

Five solutions of $x + y = 5$ are given below:

$$(1,4), (2,3), (3,2), (4,1), (0,5)$$

The above solutions also satisfy the equation $2x + 2y = 10$.

$$\therefore x + y = 5 \dots [\text{Dividing both sides by 2}]$$

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∴ If the two equations are the same, then the two equations in two variables have all solutions common.

Question 5.

$3x - 4y - 15 = 0$ and $y + x + 2 = 0$. Can these equations be solved by eliminating x ? Is the solution same? (Textbook pg. no. 84)

Solution:

$$3x - 4y - 15 = 0$$

$$\therefore 3x - 4y = 15 \dots(i)$$

$$y + x + 2 = 0$$

$$\therefore x + y = -2 \dots(ii)$$

Multiplying equation (ii) by 3,

$$3x + 3y = -6 \dots(iii)$$

Subtracting equation (iii) from (i),

$$\begin{array}{r} 3x - 4y = 15 \\ 3x + 3y = -6 \\ \hline - \quad - \quad + \\ -7y = 21 \\ \therefore y = \frac{-21}{7} \end{array}$$

$$\therefore y = -3$$

Substituting $y = -3$ in equation (ii),

$$\therefore x - 3 = -2$$

$$\therefore x = -2 + 3$$

$$\therefore x = 1$$

$$\therefore (x, y) = (1, -3)$$

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Yes, the given equations can be solved by eliminating x. Also, the solution will remain the same.



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Class 9 Maths

Part 1

- Chapter 1.1- Sets
- Chapter 1.2- Sets
- Chapter 1.3- Sets
- Chapter 1.4- Sets
- Chapter 2.1- Real Numbers
- Chapter 2.2- Real Numbers
- Chapter 2.3- Real Numbers
- Chapter 2.4- Real Numbers
- Chapter 2.5- Real Numbers
- Chapter 3.1- Polynomials
- Chapter 3.2- Polynomials
- Chapter 3.3- Polynomials
- Chapter 3.4- Polynomials
- Chapter 3.5- Polynomials
- Chapter 3.6- Polynomials
- Chapter 4.1- Ratio and Proportion
- Chapter 4.2- Ratio and Proportion
- Chapter 4.3- Ratio and Proportion
- Chapter 4.4- Ratio and Proportion
- Chapter 4.5- Ratio and Proportion
- Chapter 5.1- Linear Equations in Two Variables
- Chapter 5.2- Linear Equations in Two Variables
- Chapter 6.1- Financial Planning
- Chapter 6.2- Financial Planning
- Chapter 7.1- Statistics
- Chapter 7.2- Statistics
- Chapter 7.3- Statistics
- Chapter 7.4- Statistics

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- Chapter 7.5- Statistics

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The Maharashtra State Board of Secondary and Higher Secondary Education or MSBSHSE (Marathi: महाराष्ट्र राज्य माध्यमिक आणि उच्च माध्यमिक शिक्षण मंडळ), is an **autonomous and statutory body established in 1965**. The board was amended in the year 1977 under the provisions of the Maharashtra Act No. 41 of 1965.

The Maharashtra State Board of Secondary & Higher Secondary Education (MSBSHSE), Pune is an independent body of the Maharashtra Government. There are more than 1.4 million students that appear in the examination every year. The Maha State Board conducts the board examination twice a year. This board conducts the examination for SSC and HSC.

The Maharashtra government established the Maharashtra State Bureau of Textbook Production and Curriculum Research, also commonly referred to as Ebalbharati, in 1967 to take up the responsibility of providing quality textbooks to students from all classes studying under the Maharashtra State Board. MSBHSE prepares and updates the curriculum to provide holistic development for students. It is designed to tackle the difficulty in understanding the

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concepts with simple language with simple illustrations. Every year around 10 lakh students are enrolled in schools that are affiliated with the Maharashtra State Board.

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How many state boards are there in Maharashtra?

The Maharashtra State Board of Secondary & Higher Secondary Education, conducts the HSC and SSC Examinations in the state of Maharashtra through its nine Divisional Boards located at Pune, Mumbai, Aurangabad, Nasik, Kolhapur, Amravati, Latur, Nagpur and Ratnagiri.

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