

# Solution of a Linear Equation

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Solving [linear equation](#) means determining its roots.

Three methods of solving a linear equation:

- Trial and Error method.
- Systematic method.
- Transposition method.

Let's go through each of the methods one by one.

## Trial and Error method

In this method, we often make a guess of the root of the [equation](#). We find the values of L.H.S. and R.H.S. of the given equation for different values of the [variable](#). The value of the variable for which L.H.S. = R.H.S. is the root of the equation.

**Example:** Solve  $x + 7 = 10$  by the [trial and error method](#).

We first evaluate the L.H.S. and R.H.S. of the given equation for some values of  $x$  and continue to give new values till the L.H.S. becomes equal to the R.H.S.

x	L.H.S.	R.H.S.	Is L.H.S. = R.H.S.?
1	$1 + 7 = 8$	10	No
2	$2 + 7 = 9$	10	No
3	$3 + 7 = 10$	10	Yes

Clearly, L.H.S. = R.H.S. for  $x = 3$ . Hence,  $x = 3$  is the solution of the given equation.

## Systematic method

In this method, we solve the equation by using the following rules:

**Rule 1** – Same quantity (number) can be added to both sides of an equation without changing the equality.

**Rule 2** – Same quantity (number) can be subtracted from both sides of an equation without changing the equality.

**Rule 3** – Both sides of an equation may be multiplied by the same non – zero number without changing the equality.

**Rule 4** – Both sides of an equation may be divided by the same non – zero number without changing the equality.

**Example: Solve the equation:  $X/5 + 11 = 1/15$ .**

We have,  $X/5 + 11 = 1/15$

$$X/5 + 11 - 11 = 1/15 - 11$$

$$X/5 = 1/15 - 11$$

$$X/5 = (1 - 165)/15$$

$$X/5 = -164/15$$

$$5 \times X/5 = 5 \times -164/15$$

$$X = -164/3$$

Thus,  $X = -164/3$  is the solution of the given equation.

## Transposition method

The transposition method involves the following equation:

**Step 1** – Obtain the linear equation.

**Step 2** – Identify the variable (unknown quantity) and constants (numerals).

**Step 3** – Simplify the L.H.S. and R.H.S. to their simplest forms by removing brackets.

**Step 4** – Transpose all terms containing variable on L.H.S. and constant terms on R.H.S. Note that the sign of the terms will change in shifting them from L.H.S. to R.H.S. and vice versa.

**Step 5** – Simplify L.H.S. and R.H.S. in the simplest form so that each side contains just one term.

**Step 6** – Solve the equation obtained in Step 5 by dividing both sides by the coefficient of variable on L.H.S.

**Example: Solve:  $X/2 - 1/5 = X/3 + 1/4$**

We have,  $X/2 - 1/5 = X/3 + 1/4$

The denominators on two sides are 2, 5, 3 and 4. Their L.C.M. is 60.

Multiplying both sides of the given equation by 60, we get

$$60(X/2 - 1/5) = 60(X/3 + 1/4)$$

$$60 \times X/2 - 60 \times 1/5 = 60 \times X/3 + 60 \times 1/4$$

$$30X - 12 = 20X + 15$$

$$30X - 20X = 15 + 12 \text{ [On transposing } 20X \text{ to L.H.S. and } -12 \text{ to R.H.S.]}$$

$$10X = 27$$

$$X = 27/10$$

Hence,  $X = 27/10$  is the solution of the given linear equation.

**Try these questions now:**

1.  $1/3x - 5/2 = 6$  (Answer:  $x = 5/2$ )

2.  $x + 7 - 8x/3 = 17/6 - 5x/8$  (Answer:  $x = 4$ )

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Now try it yourself! Should you still need any help, [click here](#) to schedule live online session with e Tutor!

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## Reference Links :

- [http://en.wikipedia.org/wiki/Linear\\_equation](http://en.wikipedia.org/wiki/Linear_equation)
- <http://en.wikipedia.org/wiki/Equation>

- [http://en.wikipedia.org/wiki/Variable\\_\(mathematics\)](http://en.wikipedia.org/wiki/Variable_(mathematics))
- [http://en.wikipedia.org/wiki/Trial\\_and\\_error](http://en.wikipedia.org/wiki/Trial_and_error)

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