

Solve Equations with an Unknown on Both Sides of the Equals Sign- PDF Copy

The presentation contains the slides below with the objective of showing how to: **Solve equations that contain an unknown term on both sides of the equals sign.**

Equations

Objectives:
Solve equations that contain an unknown term on both sides of the equals sign



1

Here is a very simple equation

$$x + 2 = 5$$

Left-hand side LHS $\rightarrow x + 2 - 2 = 5 - 2$

$$x = 3$$

Right-hand side RHS

For the LHS and RHS to be equal $x = 3$
 $3 + 2 = 5$

We could find this answer by subtracting 2 from both sides...

This method can be used to find the answer to more difficult equations like this...



2

Subtract 4 from both sides

$$7x + 4 = 19 + 2x$$

$$\rightarrow 7x + 4 - 4 = 19 + 2x - 4$$

$$7x = 15 + 2x$$

Subtract 2x from both sides

$$\rightarrow 7x - 2x = 15 + 2x - 2x$$

$$\rightarrow 5x = 15$$

Divide both sides by 1

$$\rightarrow 5x \div 5 = 15 \div 5$$

$$x = 3$$

Notice $+4 \rightarrow -4$ and $+2x \rightarrow -2x$

We can use this pattern to help solve equations quickly like this...



3

Here is an example of how the pattern used to solve an equation:

$$7x + 5 = 17 + 3x$$

The + 5 gives a - 5 on the other side

$$\rightarrow 7x = 17 + 3x - 5$$

$$\rightarrow 7x - 3x = 17 - 5$$

The + 3x gives a - 3x on the other side

$$\rightarrow 2x = 12$$

$$\rightarrow x = 12 \div 2$$

Now, tidy up and solve

$$x = 6$$


4

Using the example as a guide, try to solve these two equations

$$2x + 4 = 13 + 2x$$

$$\rightarrow 2x + 4 - 2x = 13 + 2x - 2x$$

$$\rightarrow 4 = 13 - 4$$

$$\rightarrow 1x = 11$$

$$\rightarrow x = 11 \div 1$$

$$\rightarrow x = 11$$

1. $8x + 5 = 25 + 3x$

$$\rightarrow 8x = 25 + 3x - 5$$

$$\rightarrow 8x - 3x = 25 - 5$$

$$\rightarrow 5x = 20$$

$$\rightarrow x = 20 \div 5$$

$$\rightarrow x = 4$$

2. $7x + 5 = 4x + 29$

$$\rightarrow 7x = 4x + 29 - 5$$

$$\rightarrow 7x - 4x = 29 - 5$$

$$\rightarrow 3x = 24$$

$$\rightarrow x = 24 \div 3$$

$$\rightarrow x = 8$$


5

Showing working, have a go at solving these:

1) $7x + 3 = 13 + 2x$

$$7x = 13 + 2x - 3$$

$$7x - 2x = 13 - 3$$

$$5x = 10$$

$$x = 10 \div 5$$

$$x = 2$$

2) $12x + 8 = 23 + 7x$

$$12x = 23 + 7x - 8$$

$$12x - 7x = 23 - 8$$

$$5x = 15$$

$$x = 15 \div 5$$

$$x = 3$$

3) $5x + 7 = 31 + x$

$$5x = 31 + x - 7$$

$$5x - x = 31 - 7$$

$$4x = 24$$

$$x = 24 \div 4$$

$$x = 6$$

4) $9x + 6 = 27 + 2x$

$$12x = 23 + 7x - 8$$

$$9x - 2x = 27 - 6$$

$$7x = 21$$

$$x = 21 \div 7$$

$$x = 3$$


6

Here is an example of how the pattern used to solve an equation containing a minus sign:

$$8x - 5 = 19 + 5x$$

The - 5 gives a + 5 on the other side

$$\rightarrow 8x = 19 + 5x + 5$$

The + 5x gives a - 5x on the other side

$$\rightarrow 8x - 5x = 19 + 5$$

$$\rightarrow 3x = 24$$

$$\rightarrow x = 24 \div 3$$

$$\rightarrow x = 8$$

Now, tidy up and solve



7

Here is an example of how the pattern used to solve an equation containing two minus signs:

$$7x - 3 = 15 - 2x$$

The - 3 gives a + 3 on the other side

$$\rightarrow 7x = 15 - 2x + 3$$

The - 2x gives a + 2x on the other side

$$\rightarrow 7x + 2x = 15 + 3$$

$$\rightarrow 9x = 18$$

$$\rightarrow x = 18 \div 9$$

$$\rightarrow x = 2$$

Now, tidy up and solve



8

1) $12x - 7 = 15 + x$

$$12x = 15 + x + 7$$

$$12x - x = 15 + 7$$

$$11x = 22$$

$$x = 22 \div 11$$

$$x = 2$$

2) $3x + 9 = 41 - 5x$

$$3x = 41 - 5x - 9$$

$$3x + 5x = 41 - 9$$

$$8x = 32$$

$$x = 32 \div 8$$

$$x = 4$$

3) $3x - 11 = 17 - x$

$$3x = 17 - x + 11$$

$$3x + x = 17 + 11$$

$$4x = 28$$

$$x = 28 \div 4$$

$$x = 7$$

4) $12 - 2x = 27 - 7x$

$$-2x = 27 - 7x - 12$$

$$7x - 2x = 27 - 12$$

$$5x = 15$$

$$x = 15 \div 5$$

$$x = 3$$


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