

Solve Equations with Brackets - PDF Copy

The presentation contains the slides below with the objective of showing how to: **Solve equations that contain terms inside brackets.** There are an animated explanations and problems with answers.

Equations with Brackets

Objectives:
Solve equations that contain terms inside brackets

1

$3 + 2 \times 4 = 11$ ✓

Is the answer to this calculation 21 or 11?

11s 11 because we always do multiply before add, so it's $3 + 8 = 11$

The order that we do operations (work things out) in maths is:

- 1st Brackets
- 2nd Powers
- 3rd Multiply and divide
- 4th Addition and subtract

2

So to do this calculation we would...

$4^2 + (3 + 7) \times (10 - 5)$

Workout the brackets

$\rightarrow 4^2 + 10 \times 5$

Workout powers

$\rightarrow 16 + 10 \times 5$

Multiply

$\rightarrow 16 + 50$

Add

$\rightarrow 66$

- 1st Brackets
- 2nd Powers
- 3rd Multiply and divide
- 4th Addition and subtract

3

An equation containing brackets can cause problems because...

$7 + 3(x - 4) = 16$

We need to do the brackets first but cannot until we have found the value of x

Fortunately, we can multiply out the brackets like this...

4

Multiply the terms inside the brackets by the term at the front...

$3 \times x = 3x$ $-3 \times -4 = +12$

This gives the equation...

$7 + 3(x - 4) = 16$

We can solve this...

$7 + 3x - 12 = 16$

$\rightarrow 7 + 3x = 16 + 12$

$\rightarrow 3x = 16 + 12 - 7$

$\rightarrow 3x = 21$

$\rightarrow x = 21 \div 3$

$\rightarrow x = 7$

5

By multiplying out the brackets and solve these:

1) $4 + 2(x + 3) = 20$ 3) $6 + 4(x + 5) = 34$

$\rightarrow 4 + 2x + 6 = 20$ $\rightarrow 6 + 4x + 20 = 34$

$\rightarrow 2x = 20 - 6 - 4$ $\rightarrow 4x = 34 - 6 - 20$

$\rightarrow 2x = 10$ $\rightarrow 4x = 8$

$\rightarrow x = 5$ $\rightarrow x = 2$

2) $5 + 3(x - 3) = 17$ 4) $9 + 5(x - 2) = 29$

$\rightarrow 5 + 3x - 9 = 17$ $\rightarrow 9 + 5x - 10 = 29$

$\rightarrow 3x = 17 - 5 + 9$ $\rightarrow 5x = 29 - 9 + 10$

$\rightarrow 3x = 21$ $\rightarrow 5x = 30$

$\rightarrow x = 7$ $\rightarrow x = 6$

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Brackets Multiplied by Negative Terms

7

Here is an example of an equation with a negative term in front of the brackets:

$7 - 3(2 - x) = 25$

We still multiply out the brackets but need to take care with the multiplication rule for + and - signs like this...

8

Multiply the terms inside the brackets by the term at the front...

$-3 \times 2 = -6$ $-3 \times -x = 3x$

This gives the equation...

$7 - 3(2 - x) = 25$

We can solve this...

$7 - 6 + 3x = 25$

$\rightarrow 1 + 3x = 25$

$\rightarrow 3x = 25 - 1$

$\rightarrow 3x = 24$

$\rightarrow x = 24 \div 3$

$\rightarrow x = 8$

9

Try this one...

$-4 \times 2 = -8$ $-4 \times -x = 4x$

$11 - 4(2 - x) = 24$

$11 - 8 + 4x = 24$

$\rightarrow 3 + 4x = 24$

$\rightarrow 4x = 24 - 3$

$\rightarrow 4x = 21$

$\rightarrow x = 21 \div 4$

$\rightarrow x = 7.25$

10

In an equation like the one below, there is a 1 in front of the brackets:

$9 - 1(3 - x) = 10$

The 1 is not normally written

$9 - 3 + x = 10$

We can solve this...

$\rightarrow 6 + x = 10$

But when it multiplies out the bracket, it changes the signs like this...

$\rightarrow x = 10 - 6$

$\rightarrow x = 4$

11

By multiplying out the brackets and solve these:

1) $8 - 2(5 - x) = 12$ 3) $8x - (x + 5) = 16$

$\rightarrow 8 - 10 + 2x = 12$ $\rightarrow 8x - x - 5 = 16$

$\rightarrow 2x = 12 + 10 - 8$ $\rightarrow 7x = 16 + 5$

$\rightarrow 2x = 14$ $\rightarrow 7x = 21$

$\rightarrow x = 7$ $\rightarrow x = 3$

2) $9x - 4(x - 3) = 42$ 4) $7x - 3(x - 2) = 16$

$\rightarrow 9x - 4x + 12 = 42$ $\rightarrow 7x - 3x + 6 = 16$

$\rightarrow 5x = 42 - 12$ $\rightarrow 4x = 16 - 6$

$\rightarrow 5x = 30$ $\rightarrow x = 10$

$\rightarrow x = 6$ $\rightarrow x = 2.5$

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Equations with Brackets on Both Sides

13

$7x + 4(x - 3) = 3(x + 2)$

Sometimes, equations like the example above will have brackets on both sides of the equals sign.

To solve these we...

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Multiply out the brackets

$8x + 4(x - 3) = 3(x + 2)$

Now solve this equation...

$8x + 4x - 12 = 3x + 6$

$8x + 4x = 3x + 6 + 12$

$8x + 4x - 3x = 6 + 12$

$9x = 18$

$x = 18 \div 9$

$x = 2$

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Here is one for you to try...

Multiply out the brackets

$2x + 2(4x - 3) = 3(x + 5)$

Now we can solve...

$\rightarrow 2x + 8x - 6 = 3x + 15$

$\rightarrow 2x + 8x - 6 - 3x = 15$

$\rightarrow 2x + 8x - 3x = 15 + 6$

$\rightarrow 7x = 21$

$\rightarrow x = 21 \div 7$

$\rightarrow x = 3$

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Another to try...

Multiply out the brackets

$9x - 2(4 - 2x) = 5(x + 4)$

Now we can solve...

$\rightarrow 9x - 8 + 4x = 5x + 20$

$\rightarrow 9x + 4x = 5x + 20 + 8$

$\rightarrow 9x + 4x - 5x = 20 + 8$

$\rightarrow 8x = 28$

$\rightarrow x = 28 \div 8$

$\rightarrow x = 3.5$

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