Solving Equations

Solving an equation means working out the number that is represented by the letter in the equation – so your final answer will look like this: "x = 4".

To solve an equation you need to strip away all of the numbers from the letter by doing the opposite of the numbers' function (so if you have a minus then you need to add to both sides). You do this in the reverse order to BIDMAS. Are you ready to get started? Let's look at an example…

Worked example 1:
Solve the following equation:
2x + 5 = 7

To answer this you need to "get rid" of the 2 and the 5 from around the x. To deal with the "+ 5" subtract 5 and then to deal with the "x 2" divide by 2.
Remember the golden rule of equations – whatever you do to one side you must do to the other. So when you subtract 5 from the left hand side, you must do the same on the right hand side. The working below shows how to do this step by step:

2x + 5 = 7   ⟶   2x = 2
-5   -5

2x = 2   ⟶   x = 1
÷ 2 ÷ 2

x = 1

The great thing about solving equations is that you can check whether you're right. Simply substitute your answer back into the equation!
In our example, substitute x for 1, so: (2 x 1) + 5 = 7. You know this sum is correct so you know you have got the right answer.

Got it? Okay, let's move on to a harder one…

Solving equations with letters on both sides

Equations get a bit harder when you have letters on both sides of the equals sign. With these ones you need to add in an extra step at the start – you need to "get rid" of the letters from one side of the equation by adding or subtracting, remember that **whatever you do to one side of the equation you must do to the other side as well**. Always try to keep your letters positive (it makes it much easier!). For example:

Worked example 2:

Solve the following equation: 2a + 4 = 4a - 2

2a + 4 = 4a – 2   → | 4 = 2a - 2 |
-2a   -2a

4 = 2a – 2   → | 6 = 2a |
+2   +2

6 = 2a   → | a = 3 |
÷ 2 ÷ 2

a = 3

Remember to check that this works by putting 3 into the original equation instead of a.

Solving Equations – practice questions

1. $4x = 24$

2. $x + 5 = 11$

3. $2a - 3 = 7$

4. $2x + 5 = 9$

5. $3y - 2 = 25$

6. 3x + 2 = x + 8

7. 2x + 5 = 4x − 3