

## Solving Equations

You should be able to: Solve Simple Equations.  
Solve Simple Inequalities.

Example 1:

Solve the equation:  $x + 3 = 7$

Here you can use one of two methods:


- ① Balancing Method
- ② Change the side, change the sign.

- ① Treat the equation like an old fashioned scale. To balance the scale, what you do to one side, you must and always do to the other.

$$\begin{array}{l} \text{i.e. } x + 3 = 7 \\ \quad - 3 \quad - 3 \\ \hline x = 7 - 3 \\ x = 4 \end{array}$$

Take 3 away from both sides  
so that we get  $x$  on its own.

- ② Or use the method of change the side, change the sign to swap the numbers over to the other side so that we just get  $x$  on its own.


$$\begin{array}{l} \text{i.e. } x + 3 = 7 \\ x = 7 - 3 \\ x = 4 \end{array}$$

As soon as a number flies  
over an equals its sign changes.  
all +'s become -'s and  
all -'s become +'s

### Example 2

Solve the equation:  $2x = 6$

Remember  $2x$  means  $2 \times x$ . So to get rid of the multiplied by 2 you just divide by 2. And because it is an equation. What you do to one side you do to the other.

$$\begin{aligned} \text{i.e. } 2x &= 6 \\ \div 2 \quad \div 2 & \\ x &= 3 \end{aligned}$$

### Example 3

Solve the equation:  $3x + 4 = 13$

Now put examples 1 & 2 together. First get rid of the single number via Example 1. And divide by the multiple as per Example 2.

$$\begin{aligned} \text{So } 3x + 4 &= 13 \\ -4 \quad -4 & \\ 3x &= 13 - 4 \\ 3x &= 9 \\ \div 3 \quad \div 3 & \\ x &= 3 \end{aligned}$$

Note: Always remember to do the check to putting the number back into the equation to check if it's correct.

$$\begin{aligned} \text{i.e. } 3 \times 3 + 4 &= \\ = 9 + 4 & \\ = 13 & \end{aligned}$$

IT WORKS!

### Example 4

$$\text{Solve } = 3x - 5 = x + 11$$

Here you must get all the  $x$ 's on one side & all the numbers on the other. You must do this in steps and not try and do it all at once. Which can get confusing.

$$\text{So: } 3x - 5 = x + 11$$

$$\textcircled{1} \quad 3x - 5 - x = 11$$

$$\textcircled{2} \quad 3x - x = 11 + 5$$

$$\textcircled{3} \quad 2x = 16$$

$$\textcircled{4} \quad \div 2 \quad \div 2$$

$$x = 8$$

- ① Take the  $x$  over to the left
- ② Take the  $-5$  over to the right side
- ③ Simplify both sides
- ④ Divide both sides by 2