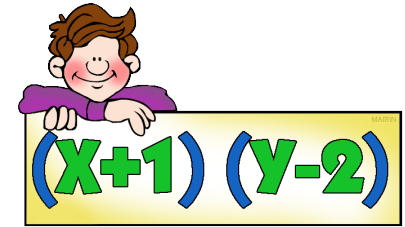


EQUATIONS & FORMULAE



Using Algebra

$$x + x + x = 3x$$

$$3x = 3 \times x$$

$\frac{x}{3}$ is x divided by 3
 $\frac{3}{x}$ is 3 divided by x

$5x + 2$ is an expression

$5x + 2 = 9$ is an equation

(only true for certain values of x)

$y = 3x + 2$ is a formula

(links one variable, x with another, y)

$5x + 15 \equiv 5(x + 3)$ is an identity

(is always true irrespective of what x is)

Mathematical Operations

Operation	Inverse
Addition	Subtraction
Multiplication	Division
Square	Square Root
Cube	Cube Root



Solving Equations

Follow these steps...

- ✓ Brackets? Expand & Simplify
- ✓ Unknowns on both sides? Get rid of the smallest unknown (be careful of the sign of the unknown)
- ✓ Solve as a basic two-step equation
- ✓ **GOLDEN RULES – WHAT YOU DO TO ONE SIDE DO THE SAME TO THE OTHER. TO GET RID OF SOMETHING DO ITS INVERSE**

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

Expand the brackets

$$8x + 12 = 12x - 15$$

Get rid of the smallest unknown ($8x$)

Subtract $8x$ from **both sides**

$$12 = 4x - 15$$

Get rid of the -15 by $+15$ to **both sides**

$$27 = 4x$$

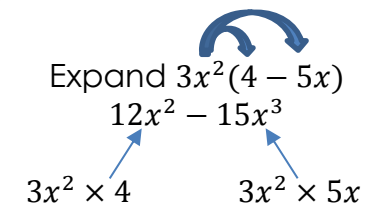
Get rid of the $x4$ by $\div 4$ on **both sides**

$$8.75 = x$$

Factorising and Expanding

These are inverses of each other – **factorising** means looking for common factors and putting brackets in. **Expanding** means getting rid of the brackets

Factorise $12x^2 - 15x^3$
 Common factors are 3 and x^2
 $3x^2(4 - 5x)$



Changing the Subject

The subject is the variable the formula is designed to find.

In $y = 6x + 1$, y is the **subject**

To **change the subject** follow the same rules as solving and imagine the new subject is what you are trying to solve for.

Make x the subject in $y = \frac{4x+1}{3}$

Move the 3 by \times both sides by 3

$$3y = 4x + 1$$

Move the $+1$ by -1 from both sides

$$3y - 1 = 4x$$

Move the 4 by \div both sides by 4

$$\frac{3y - 1}{4} = x$$

x is now the subject