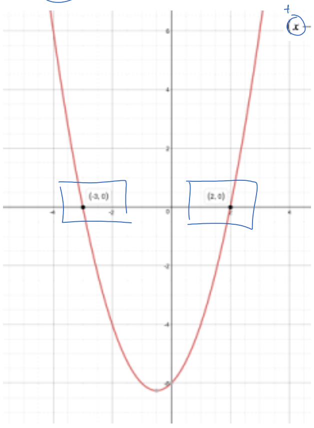
Expanding and collecting like terms

Tuesday, 13 February 2018 6:18 pm

The work which will need to be done once teaching has taken place is:

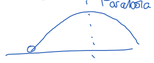
Expansion	MM Ex. 3A	1cf 3cd 4be 5cdef 6bd 7bef 8cfg 9b 10

Why are quadratics so important?

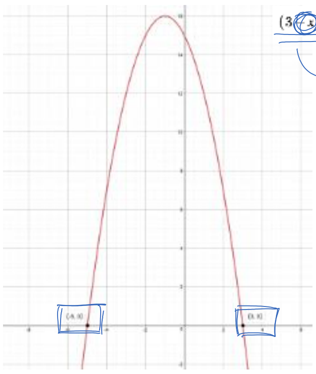


$(x-2)(x+3) = 0$

AFL

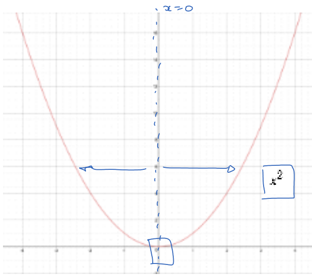


Burger Tump!



$(3-x)(x+5) = 0$

BFT



EVEN Function
Min (0,0)

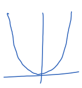
Completing square

Finding the **solution** to quadratics is simply us finding where the quadratic crosses the x-axis. The standard curve can be moved around, stretched and flipped to give lots of different curves. But they all basically come from the same one.

$y = x^2$

Quadratics can be written in lots of different ways.
Most of them are written to try and trick you.
Remember, Maths is a **BIG FAT TRICK.**

2 Highest power of 2



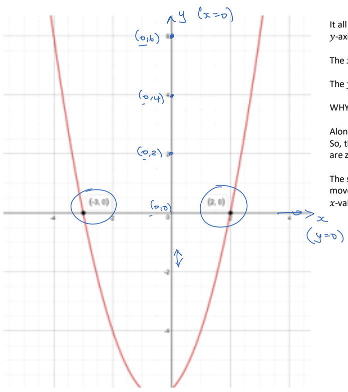
$y = x^2$

$y = x^2 - 2x$

$y = x^2 + 3x - 2$

$x^3 + 2x^2 + x + 3$
cubic

When we **solve** quadratics we are effectively making the y-value equal to zero.



It all has something to do with what the x- and y-axis can be called.

The x-axis is also called the line $y = 0$

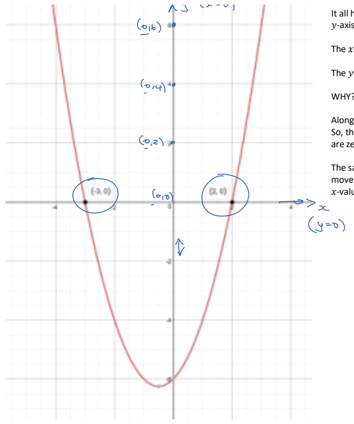
The y-axis is also called the line $x = 0$

WHY?

Along the x-axis there is no height.
So, the y values for all points along the x-axis are zero!

The same for the y-axis. As there is no movement along the x-axis every point has an x-value of zero!

$y = 3x^2 + 2x - 6$
$0 = 3x^2 + 2x - 6$



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When we make the y-value zero … we are finding the crossing points.
This is called finding the solution.
When we make quadratics equal to zero it adds a whole new level of trickery.

This one equation can be written in lots of different ways, but they are all the same equation.

$x^2 + 5x - 2 = 0$ ①

$\boxed{x^2 + 5x = 2}$

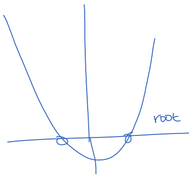
$x^2 - 2 = -5x$

$x(x + 5) = 2$

$\boxed{x = \frac{2}{x+5}}$

$\boxed{x + 5 = \frac{2}{x}}$

$\boxed{x = \frac{2}{x} - 5}$



$\boxed{x^2 + 5x = 2}$ -2

$x^2 + 5x - 2 = 0$

FRACTIONS!

$+ \quad -$

$\times \quad \div$

To **solve** equations we always need them to be written in the same form:

$$\boxed{ax^2 + bx + c = 0}$$

$ax^2 + bx + c = 0$

This is the premise for the work we are about to move onto …
But first, lets not run before we can walk!

Expanding brackets

Expanding brackets means to multiply them out.
HINT: Be careful of the minus signs!!!!

E.g. $4(x + 5)$ $= 4x + 20$

E.g. $-3(4 - x)$ $= -12 + 3x$

E.g. $5(2x - 2) - 3(4x + 2)$ $= 10x - 10 - 12x - 6$
$= -2x - 16$

E.g. $(3x + 4)(2x - 3)$ $= 6x^2 - 9x + 8x - 12$
$= 6x^2 - x - 12$

E.g. $(x - \sqrt{7})(x + \sqrt{7})$ $= x^2 + \cancel{\sqrt{7}}x - \cancel{\sqrt{7}}x - \sqrt{7}.\sqrt{7})$
$= x^2 - 7$

$(\sqrt{7})^2 = 7$

$\sqrt{7} \times \sqrt{7}$
$= (\sqrt{7})^2$
$= 7$

$\sqrt{7}x$

$\sqrt{7}x$

$x\cancel{\sqrt{7}}$

$2\sqrt{3} - \sqrt{3} = \sqrt{3}$

E.g. $(2x - \sqrt{3})(x + \sqrt{3})$ $= 2x^2 \boxed{+ 2\sqrt{3}x - \sqrt{3}x} - 3$
$= 2x^2 + \sqrt{3}x - 3$

Collect like terms

When you collect like terms, you add together the terms which are the same.
Remember, x^2 terms are NOT the same as x terms. You cannot add these together

Note:
$x^2 + x^2 = 2x^2$
$x + 3x = 4x$
$x^2 + x \neq$ *anything!!!!*

E.g. $3x + 4x - 3$

$1x - 3$

E.g. $2x^2 + 3x - x^2 + 2x - 4 \quad = \quad x^2 + 5x - 4$