

The Quadratic Formula

There is a nice formula for finding the roots (zeroes, "where the graph crosses the x -axis"). The idea is that given a quadratic polynomial:

$$y = ax^2 + bx + c$$

We can say the roots occur at:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

We could plug this back into our equation and see that we do indeed get zero, but for now, I will ask you to just believe me.

Example:

Find the roots of the polynomial $y = 2x^2 - 6x + 4$.

To do this, we see we can simply apply the given formula to get:

$$\begin{aligned} x &= \frac{-(-6) \pm \sqrt{(-6)^2 - 4(2)(4)}}{2(2)} \\ &= \frac{6 \pm \sqrt{4}}{4} \\ &= \frac{6 \pm 2}{4} \\ &= 2, 1 \end{aligned}$$

We notice that plugging in the values of $x = 2$ and $x = 1$ do indeed give us zero, this makes us happy.