Quadratic Equations

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A quadratic equation is a polynomial of the form

where are constants and .

In order to solve (find such that ) a quadratic equation, we can use one of several methods:

1. **Factorising by inspection**

This is where we put the equation in the form , such that , , and . Sometimes this is quite easy to figure out, especially when In this case, we tend to ask the question ‘what two numbers add to give and multiply to give ? The solutions to the quadratic equation are then given by and

1. **The quadratic formula**

This is a foolproof method for solving. If you are ever struggling to factorise a quadratic, this should be your go-to method.

We find values for when by evaluating:

**Note:**  in this case means ‘do the calculation once with a + where the is, and then once with a – where the is’

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1. **Completing the square**

We complete the square on by carrying out the following steps:

* Divide by to get:
* Take away from both sides to get:
* Rewrite the left-hand side in the format:
* Add to both sides to get:
* Take the square root of both sides:
* Take away from both sides to give a final answer of:

This method can be a bit complicated or difficult to remember. If it makes sense to you, then use it, as it works for all quadratic formulae, however we generally recommend that you use the quadratic formula instead as it’s a bit quicker.

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