

Pre-induction: Mathematics

Improve your performance with mathematical modelling

A lot of content in GCSE is based around quadratics. You learn different methods of solving them and how to sketch them but why is so much emphasis placed on these functions?

They are used to model a vast range of real-life situations and can be used to predict outcomes. Have a look at some examples of parabolic paths (U shaped curves) spread across the page! See if you work through the activities.

Role 1: Roller-coaster designer

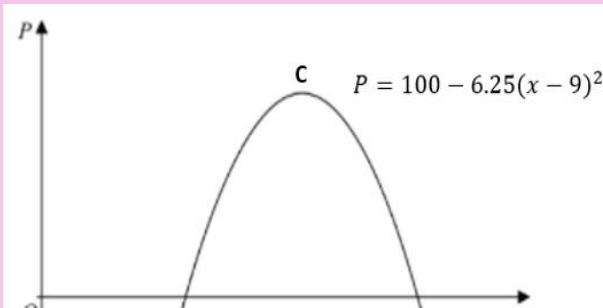
Activity One

Your first act looks something like



The ball has been thrown and has reached its peak height!

What skills would you use to find the peak of a curve?



Find Point C

(HINT: It's the peak of the curve! What equation do you need to find the turning point?)

Salary: Average £ 85000

Role 2: Financial planning & analysis Coordinator

Activity Two

Resolve your conflict, the ball has to go in the hoop!



Will the ball go through the basket? Use your maths to show me where the ball will land!

(HINT: where does it cross the x axis?)

Try these:

Where will these quadratics cross the x axis?

$$0 = x^2 - 4x - 12$$

$$0 = 2x^2 - 7x + 6$$

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

Salary: Average £ 46000

Role 3: Civil Engineer

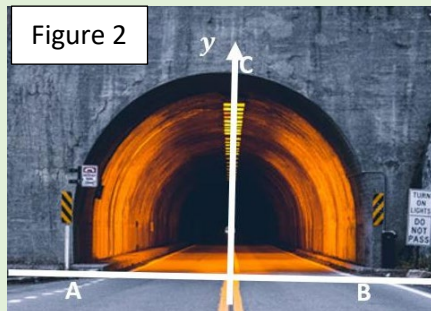
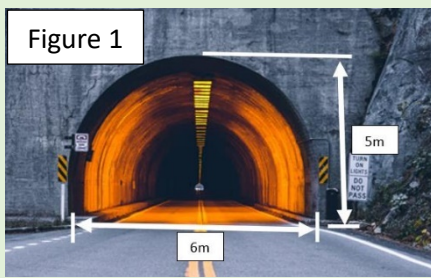
Activity Three

Perfect your throw... practice makes perfect!



This picture is of a proposed tunnel! The shape is clearly a parabola which means we can use a quadratic equation whether traffic can fit through it or if warning signs need to be placed.

Using the information in figure 1 can you identify the coordinates A, B, C in figure 2? If you can, can you use these to build a quadratic equation?



Earning: Average £77000

