

# Sketching Graphs of Quadratic Functions

## What you need to find out about the function $f(x)$

1.  $f(0)$  gives the intercept of the graph with the  $y$  axis
2. the roots of the  $f(x) = 0$  give the intercept of the graph with the  $x$  axis
3. The coordinates of the turning point

## Finding the coordinates of the turning point

1. Using the equation of the graph;  $y = ax^2 + bx + c$

### **x coordinate**

Use the main features of a quadratic that;

1. the vertical line of symmetry passes through the turning point
2. the vertical line of symmetry also passes through the mid point of the roots of  $ax^2 + bx = 0$

### **y coordinate**

The  $y$  coordinate is the value of the function  $f(x) = x^2 + bx + c$  when  $x$  is set to the mid point of the roots of;

$$ax^2 + bx = 0$$

### **Using the equation of the graph vertex form; $y - k = a(x - h)^2$**

The coordinates of the turning point are  $(h, k)$

1. Start with  $y = ax^2 + bx + c$
2. Write the RHS in the form of a perfect square  $y = a(x + h)^2 - k$
3. Add  $k$  to both sides to get;  $y + k = a(x + h)^2$
4. Adjust signs of  $h$  and  $k$  to give;  $y - k = a(x - h)^2$