

# AS CORE MATHS

Plotting, solving, sketching and interpreting quadratic functions.

## Sketching and Interpreting

- Shape
- Intercepts
- Turning point
- "Curve sketching"

PARABOLA

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

$$y = a(x-p)^2 + q$$

## Vocabulary

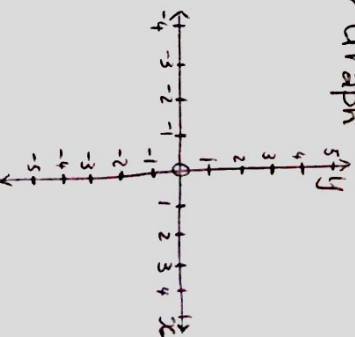
- Expression / Equation
- General form
- Coefficient
- Constant
- Minimum/Maximum value (Turning point)
- Axis / Line of symmetry
- Shape of a parabola
- The discriminant
- Roots/solutions/x-intercepts
- Completing the square
- Quadratic Formula
- Intercepts

## Plotting

Equation → Table → Graph

$$y = x^2 - 3x - 4$$

x	y
-2	
-1	
0	
1	
2	
3	
4	
5	



## The Discriminant $\Delta = b^2 - 4ac$

ROOTS (x-intercepts)

- $\Delta < 0$
- $\Delta = 0$
- $\Delta > 0$

Equal? Rational? Real?  
Irrational? Unequal? Non-real?

$$3x^2 - 2x - 5 = 0$$

$$x^2 + 4 = 0$$

$$y = 3x^2 + 5x - 2$$

$$y = x^2 + 8x - 1$$

$$y = 7 - 6x - x^2$$

## Solving Quadratic Equations

### Factorising

- Common factor
- 2 binomials
- Difference of two squares

$$3x^2 + 12x = 0$$

$$2x^2 - 5x - 25 = 0$$

$$x^2 - 16 = 0$$

### FORMULA

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

Rational/Irrational Roots

$$x^2 + 8x + 5 = 0$$

### COMPLETING THE SQUARE

\*CHECK FIRST NO COEFFICIENT OF  $x^2$ !

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

$$x^2 + 5x - 1 = 0$$

$$4x^2 + 12x - 8 = 0$$

$$ax^2 + bx + c$$

$$(x-p)^2 + q$$