# Year 10 Unit 7: 2D Harder Algebra

## SOLVING QUADRATIC EQUATIONS

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| **quadratic** | a **polynomial** where the highest power of x is **$x^2$** |
| **solving a quadratic** | finding the **roots of the graph**<br>there are usually **two** roots / **solutions** |
| **general quadratic equation** | a quadratic equation is of the form<br>***$ax^2 + bx + c = 0$***<br>where **a, b and c are numbers**, a ≠ 0 |
| **the quadratic formula** | $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ |
| **factor** | a **quantity** which **divides equally** into a number, e.*g. factors of 8 are 1, 2, 4 and 8* |
| **factorising a general quadratic** | quadratic: **$x^2 + bx + c$**<br>factorised form: **(x + ?)(x + ?)**<br>'?' are **two numbers** whose **product is 'c'** and **sum is 'b'** |
| **difference of two squares** | quadratic: **$a^2 - b^2$**<br>factorised form: **(a – b)(a + b)**<br>**square root each number** from the **original expression** |
| **completing the square** | a quadratic in the form $x^2 + bx + c$<br>written in the form $(x + p)^2 + q$<br>the turning point of the quadratic is **(-p,q)** |

## SIMPLIFYING ALGEBRA

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| **collect like terms** | you can **add** or **subtract** like terms using the **coefficients** |
| **simplifying algebraic fractions** | **factorise** the **numerator** and **denominator** and **cancel common factors,** sometimes requires factorisation |

## FUNCTIONS

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| **function** | a special **type of equation** where each input has a **single output** |
| | **input** – a **variable** you **choose**<br>**output** – a **variable** that is **calculated** |
| **function notation** | $f(x)$<br>$x$ is the **input value**<br>$f(x)$ is the **output value** |
| **inverse function** | written: **$f^{-1}(x)$**<br>a function that performs the **opposite process** of the **original function** |
| **composite function** | written: for example, **fg(x)**<br>a **combination** of **two or more functions** to create a new function<br>**fg(x)** means 'do **g** first, then **f**'<br>**gf(x)** means 'do **f** first, then **g**' |

## Links to: QUADRATIC GRAPHS

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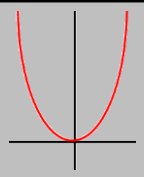
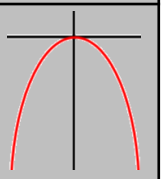
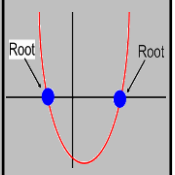
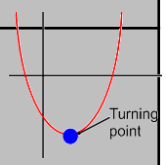
| **quadratic graph** | a graph where the **highest power** of x is **$x^2$**<br>it is always a **parabola** (a **U-shape**) | |
| | $y = x^2$ |  |
| | $y = -(x^2)$ |  |
| **roots (of graphs)** | the '**solutions**' of a graph,<br>where a **function equals zero**<br>can be found in a graph where the **curve meets the x axis** |  |
| **turning point** | the point where a graph **turns**, from negative to positive gradient or positive to negative gradient |  |

## Links to: FRACTIONS: OPERATIONS

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| **add** | you need a **common denominator,** then **add** the **numerator** | $\frac{A}{B} + \frac{C}{B} = \frac{A + C}{B}$ |
| **subtract** | you need a **common denominator,** then **add** the **numerator** | $\frac{A}{B} - \frac{C}{B} = \frac{A - C}{B}$ |
| **multiply** | **multiply** the **numerators**<br>**multiply** the **denominators** | $\frac{A}{B} \times \frac{C}{D} = \frac{AC}{BD}$ |
| **divide (KCF)** | **keep** the **first fraction**<br>**change** the **÷ to x**<br>**flip** the **second fraction,** then **multiply** | $\frac{A}{B} \div \frac{C}{D} = \frac{A}{B} \times \frac{D}{C} = \frac{AD}{BC}$ |