

Core Knowledge

Topic/Skill	Definition/Tips	Example
1. Function Machine	Takes an input value, performs some operations and produces an output value.	
2. Function	A relationship between two sets of values.	$f(x) = 3x^2 - 5$ 'For any input value, square the term, then multiply by 3, then subtract 5'.
3. Function notation	$f(x)$ x is the input value $f(x)$ is the output value.	$f(x) = 3x + 11$ Suppose the input value is $x = 5$ The output value is $f(5) = 3 \times 5 + 11 = 26$
4. Inverse function	$f^{-1}(x)$ A function that performs the opposite process of the original function. 1. Write the function as $y = f(x)$ 2. Rearrange to make x the subject. 3. Replace the y with x and the x with f⁻¹(x)	$f(x) = (1 - 2x)^5$. Find the inverse. $y = (1 - 2x)^5$ $\sqrt[5]{y} = 1 - 2x$ $1 - \sqrt[5]{y} = 2x$ $\frac{1 - \sqrt[5]{y}}{2} = x$ $f^{-1}(x) = \frac{1 - \sqrt[5]{x}}{2}$
5. Composite function	A combination of two or more functions to create a new function. $fg(x)$ is the composite function that substitutes the function $g(x)$ into the function $f(x)$. $fg(x)$ means ' do g first, then f ' $gf(x)$ means ' do f first, then g '	$f(x) = 5x - 3$, $g(x) = \frac{1}{2}x + 1$ What is $fg(4)$? $g(4) = \frac{1}{2} \times 4 + 1 = 3$ $f(3) = 5 \times 3 - 3 = 12 = fg(4)$ What is $fg(x)$? $fg(x) = 5\left(\frac{1}{2}x + 1\right) - 3 = \frac{5}{2}x + 2$

Links to substitution, using four operations, inverse operations, re-arranging, plotting inverse graphs and both composite and inverse composite graphs