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| **Topic/Skill**  | **Definition/Tips****Topic: Functions**  | **Example** |
| 1. Function Machine | Takes an **input** value, performs some **operations** and produces an **output** value. | Image result for function machine |
| 2. Function | A **relationship** between two sets of values. | $f\left(x\right)=3x^{2}-5$ ‘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. | $$f\left(x\right)=3x+11$$Suppose the input value is $x=5$The output value is $f\left(5\right)=3×5+11=26$ |
| 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** $f^{-1}\left(x\right)$ | $f\left(x\right)=(1-2x)^{5}$. Find the inverse.$y=(1-2x)^{5}$ $\sqrt[5]{y}=1-2x$ $1-\sqrt[5]{y}=2x$  $\frac{1-\sqrt[5]{y}}{2}=x$$$f^{-1}\left(x\right)=\frac{1-\sqrt[5]{x}}{2}$$ |
| 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 $g\left(x\right)$ **into** the function $f\left(x\right).$$fg(x)$ means ‘**do g first, then f**’$gf(x)$ means ‘**do f first, then g**’ | $f\left(x\right)=5x-3$, $g\left(x\right)=\frac{1}{2}x+1$What is $fg\left(4\right)$?$$g\left(4\right)=\frac{1}{2}×4+1=3$$$$f\left(3\right)=5×3-3=12=fg\left(4\right)$$What is $fg(x)$?$$fg\left(x\right)=5\left(\frac{1}{2}x+1\right)-3=\frac{5}{2}x+2$$ |

**Knowledge Organiser**