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

