FUNCTIONS

Function is a special relation such that each element in the input set is related to one and only one element in the output set.

Vertical Line Test

A vertical line test is a graphical method which can be used to determine whether a curve is the graph of a function or not. If the vertical line parallel to the y-axis intersects the graph of the curve only once, then the curve is a graph of a function. If the vertical line drawn intersects the graph of the curve more than once, then the curve is not the graph of a function.

Domain and Range

- The domain of a function refers to the range of values of x from the smallest value of x to the largest value of x.

- The range of a function refers to the range of values of $f(x)$ from the smallest value of y to the largest value of y.

Absolute Value Function

$$|f(x)| = \begin{cases} f(x), \text{ if } f(x) \geqslant 0, \\ -f(x), \text{ if } f(x) \leqslant 0. \end{cases}$$

Composite Functions

- If f is a function that maps set A to set B and g is a function that maps set B to set C, then gf is the composite function of f followed by g that maps set A straight away to set C.

- When a composite function and one of its function are given, the other function can be determined.

Inverse Functions

- Given that $y = f^{-1}(x)$, then $f(y) = x$.

- A horizontal line test can be used to test the existence of an inverse function. If the horizontal line parallel to the x-axis intersects the graph of the function only once, then the function has an inverse function. If the horizontal line drawn intersects the graph of the function more than once, then the function does not have an inverse function.

- $ff^{-1}(x) = f^{-1}f(x) = x$.

- The domain of f^{-1} is the range of f while the range of f^{-1} is the domain of f.

- The graph of f^{-1} is the reflection of the graph of f in the straight line $y = x$.