Chapter 5: Function Notation

Function Notation

Definition: The dependent variable of a function f can be represented by the expression formed by writing the independent variable name within the parentheses of $f()$

$$\text{dependent variable} = f\,(\text{independent variable})$$

We call this representation **function notation**.

Example: We may consider the linear equation $y = 2x+1$ as a function whose independent variable is x and whose dependent variable is y. We may use the name 'f' to refer to this function, in which case we would substitute '$f(x)$' for the y and use the notation:

$$f(x) = 2x + 1$$

Here we view x and the input and $f(x)$ as the output of the function. Thus to **evaluate the function** f at $x = 2$ we use the notation $f(2)$. This represents the value of the dependent variable y, when the independent variable x is equal to 2. We calculate this by replacing x with the number 2 and simplifying as follows:

$$f(2) = 2(2) + 1 = 4 + 1 = 5$$

This is called **evaluating the function** at $x = 2$.

- Evaluate the function $f(x) = 2x + 1$ at $x = -2$.

- Evaluate the function $f(x) = 2x + 1$ at $x = 0$.

- Evaluate the function $f(x) = 2x + 1$ at $x = -\dfrac{1}{2}$.

- Evaluate the function $f(x) = 2x + 1$ at $x = 100$.

x	$g(x)$
3	12
4	9
5	8
6	9
7	12

Table 1: Some values of $g(x)$.

For a function $g(x)$, the above table gives the output values for the given input values of x.

Example: We see from the table that when $x = 3$ the output $g(3) = 12$.

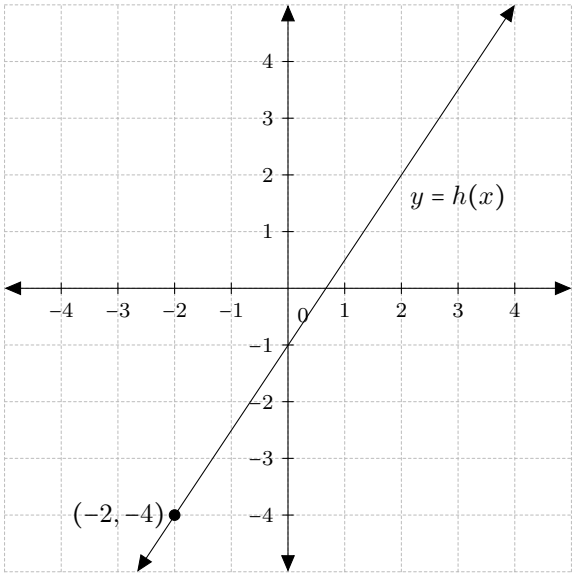
- What is $g(6)$?

- What is $g(4)$?

- When $g(x) = 8$, what is x?

- When $g(x) = 12$ what is x?

- There are two values of x that make $g(x) = 9$: $x = 4$, and $x = 6$. Does this mean that $g(x)$ is not a function? Why or Why not?



The graph of $y = h(x)$ is given above. We see that the point $(-2, -4)$ is on the graph of h. This means that when the input $x = -2$, the output $h(x) = -4$.

- What is $h(0)$?

- What is $h(2)$?

- When $h(x) = -4$, what is x?

- What is the slope, and y-intercept of this line?

- Write down an equation of this line in function notation.