



Function Notation - Part II

Video Notes

[Video Link](#)

Function Notation Part II

Background Knowledge:

- What is a Function?
- Function Notation Part I
- Expanding and Simplifying Polynomials

Sometimes inputs are algebraic, resulting in algebraic outputs as well.

If $g(x) = 3x + 5$ and $h(x) = -2x^2 - 4x + 1$, find:

$$\begin{aligned}
 &g(3a) \\
 &\quad \uparrow \text{input} \\
 &g(x) = 3x + 5 \\
 &g(3a) = 3(3a) + 5 \\
 &g(3a) = 9a + 5 \\
 &\quad \uparrow \text{output}
 \end{aligned}$$

$$\begin{aligned}
 &h(5x) \\
 &h(x) = -2x^2 - 4x + 1 \\
 &h(5x) = -2(5x)^2 - 4(5x) + 1 \\
 &h(5x) = -2(25x^2) - 4(5x) + 1 \\
 &h(5x) = -50x^2 - 20x + 1
 \end{aligned}$$

$$\begin{aligned}
 &h(x+3) \\
 &h(x) = -2x^2 - 4x + 1 \\
 &h(x+3) = -2(x+3)^2 - 4(x+3) + 1 \\
 &= -2(x^2 + 6x + 9) - 4(x+3) + 1 \\
 &= -2x^2 - 12x - 18 - 4x - 12 + 1 \\
 &h(x+3) = -2x^2 - 16x - 29
 \end{aligned}$$

$$\begin{aligned}
 &h(x-1) - g(4x^2 + 7) \\
 &h(x) = -2x^2 - 4x + 1 \quad g(x) = 3x + 5 \\
 &h(x-1) = -2(x-1)^2 - 4(x-1) + 1 \\
 &= -2(x^2 - 2x + 1) - 4(x-1) + 1 \\
 &= -2x^2 + 4x - 2 - 4x + 4 + 1 \\
 &= -2x^2 + 3 - 26 \\
 &g(4x^2 + 7) = 3(4x^2 + 7) + 5 \\
 &= 12x^2 + 21 + 5 \\
 &= 12x^2 + 26 \\
 &h(x-1) - g(4x^2 + 7) = (-2x^2 + 3 - 26) - (12x^2 + 26) \\
 &= -2x^2 + 3 - 12x^2 - 26 - 26 \\
 &= -14x^2 - 23
 \end{aligned}$$