Instruction

Guided Practice 3.7.1

Example 1

If $f(x) = 3x + 2$ and $g(x) = 2x - 7$, what is the result of adding the two functions? What is $(f + g)(x)$? How do you represent this algebraically?

1. Add the two function rules.

   $(f + g)(x) = f(x) + g(x)$

   Since $f(x) = 3x + 2$ and $g(x) = 2x - 7$, $(f + g)(x) = (3x + 2) + (2x - 7)$.

2. Combine like terms.

   Clear the parentheses and reorder the terms on the right side of the equation.

$(f + g)(x) = (3x + 2) + (2x - 7)$	Equation
$(f + g)(x) = 3x + 2 + 2x - 7$	Remove the parentheses.
$(f + g)(x) = 3x + 2x + 2 - 7$	Reorder the terms: variables with coefficients first, followed by constants.

3. Simplify the equation.

$(f + g)(x) = 3x + 2x + 2 - 7$	Equation
$(f + g)(x) = 5x - 5$	

The result of adding $f(x) = 3x + 2$ and $g(x) = 2x - 7$ is $(f + g)(x) = 5x - 5$.

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Example 2

If $f(x) = 3^x$ and $g(x) = 5$, what is the result of multiplying the two functions? What is $(f \cdot g)(x)$? How do you represent this algebraically?

1. Multiply the two function rules.

   $(f \cdot g)(x) = f(x) \cdot g(x)$

   Since $f(x) = 3^x$ and $g(x) = 5$, $(f \cdot g)(x) = (3^x) \cdot (5)$.

2. Simplify the equation.

   $(f \cdot g)(x) = (3^x) \cdot (5)$ Equation

   $(f \cdot g)(x) = 5(3^x)$

   $(f \cdot g)(x) = 5(3^x)$ is the result of multiplying $f(x) = 3^x$ and $g(x) = 5$.

Example 3

If $f(x) = 2x - 3$ and $g(x) = 4x - 11$, what is the result of subtracting the two functions? What is $(f - g)(x)$? How do you represent this algebraically?

1. Subtract the two function rules.

   $(f - g)(x) = f(x) - g(x)$

   Since $f(x) = 2x - 3$ and $g(x) = 4x - 11$, $(f - g)(x) = (2x - 3) - (4x - 11)$.

2. Combine like terms.

   Clear the parentheses and reorder the terms on the right side of the equation. Be careful to correctly distribute the negative sign.

   $(f - g)(x) = (2x - 3) - (4x - 11)$ Equation

   $(f - g)(x) = 2x - 3 - 4x + 11$ Distribute the negative.

   $(f - g)(x) = 2x - 4x - 3 + 11$ Reorder the terms: variables with coefficients first, followed by constants.

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3. Simplify the equation.

$(f-g)(x) = 2x - 4x - 3 + 11$ Equation

$(f-g)(x) = -2x + 8$

$(f-g)(x) = -2x + 8$ is the result of subtracting $f(x) = 2x - 3$ and $g(x) = 4x - 11$.

Example 4

If $f(x) = 2^x$ and $g(x) = 2$, what is the result of dividing the two functions? What is $(f \div g)(x)$? How do you represent this algebraically?

1. Divide the two function rules.

$(f \div g)(x) = f(x) \div g(x)$

Since $f(x) = 2^x$ and $g(x) = 2$, $(f \div g)(x) = (2^x) \div 2$.

2. Simplify the equation.

$(f \div g)(x) = (2^x) \div 2$ Equation

$(f \div g)(x) = \frac{2^x}{2}$ Simplify as needed.

$(f \div g)(x) = \frac{1}{2}(2^x)$

$(f \div g)(x) = \frac{1}{2}(2^x)$ is the result of dividing $f(x) = 2^x$ by $g(x) = 2$.