

Warm Up

If $f(x) = 3x^2 - 24x + 48$

$g(x) = 2x - 1$

 $(0; 1)$

Find

$f(4)$

$f(-3)$

$f(g(0))$

$g(0) = 2(0) - 1$

$g(0) = -1$

$f(-1)$

$3(-1)^2 - 24(-1) + 48$

$3 + 24 + 48 = 75$

5.1 Operations with Functions

Given the two functions:

$$f(x) = x^2 + 3x - 1 \quad g(x) = 2x + 5$$

Find:

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

$$(x^2 + 3x - 1) + (2x + 5)$$

$$x^2 + 5x + 4$$

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

$$(x^2 + 3x - 1) - (2x + 5)$$

$$x^2 + x - 6$$

Given the two functions:

$$f(x) = 2x^2 + 3x - 5 \quad g(x) = 2x - 5$$

Find:

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

$$(2x^2 + 3x - 5)(2x - 5)$$

$$4x^3 - 10x^2 + 6x^2 - 15x - 10x + 25$$

$$4x^3 - 4x^2 - 25x + 25$$

Cannot divide by zero.
Domain Restriction

$$\left(\frac{f}{g}\right)(x)$$

$$2\left(\frac{5}{2}\right) - 5 = 0$$

$$\frac{2x^2 + 3x - 5}{2x - 5} \quad x \neq \frac{5}{2}$$

$$2x - 5 = 0$$

$$2x = 5$$

$$\frac{2}{2} = \frac{5}{2}$$

5.1 Operations with Functions

Practice

Given the two functions: $f(x) = x^2 - 2x - 63$ and $g(x) = x^2 - 81$

Find:

$$\begin{array}{ll} (f+g)(x) & (f-g)(x) \\ (x^2 - 2x - 63) + (x^2 - 81) & (x^2 - 2x - 63) - (x^2 - 81) \\ 2x^2 - 2x - 144 & -2x + 18 \end{array}$$

$$\begin{array}{l} (f \cdot g)(x) \\ (x^2 - 2x - 63)(x^2 - 81) \\ x^4 - 81x^2 - 2x^3 + 162x - 63x^2 + 5103 \end{array}$$

Cannot divide by zero.
Domain Restriction.

$$\left(\frac{f}{g} \right)(x) = \frac{x^4 - 144x^2 - 2x^3 + 162x + 5103}{x^2 - 81}$$

$$\frac{(x-9)(x+7)}{(x+9)(x-9)} = \frac{x+7}{x+9}$$

$$\begin{array}{l} x+9=0 \quad x-9=0 \\ x \neq -9 \quad x \neq 9 \end{array}$$

$$f(x) = 3x^2 + 11x + 6 \quad g(x) = x + 3$$

Find:

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

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

Cannot divide by zero.
Domain Restriction.

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

$$\left(\frac{f}{g}\right)(x)$$

Find $(f + g)(x)$, $(f - g)(x)$, $(f \cdot g)(x)$, and $\left(\frac{f}{g}\right)(x)$ for each $f(x)$ and $g(x)$. Indicate any restrictions in the domain.

1. $f(x) = x + 2$
 $g(x) = 3x - 1$

2. $f(x) = x^2 - 5$
 $g(x) = -x + 8$

Find $(f + g)(x)$, $(f - g)(x)$, $(f \cdot g)(x)$, and $\left(\frac{f}{g}\right)(x)$ for each $f(x)$ and $g(x)$. Indicate any restrictions in the domain.

4. $f(x) = 2x$
 $g(x) = -4x + 5$

5. $f(x) = x - 1$
 $g(x) = 5x - 2$

Find $(f + g)(x)$, $(f - g)(x)$, $(f \cdot g)(x)$, and $\left(\frac{f}{g}\right)(x)$ for each $f(x)$ and $g(x)$. Indicate any restrictions in the domain.

8. $f(x) = x - 2$
 $g(x) = 2x - 7$

9. $f(x) = x^2$
 $g(x) = x - 5$