Operations With Functions

Adding Functions

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

Subtracting Functions

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

Multiplying Functions

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

Dividing Functions

$$(f/g)(x) = f(x)/g(x)$$

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

Let $f(x) = 5x^2 - 2x + 3$ and $g(x) = 4x^2 + 7x - 5$

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

Find $(f + g)(x)$

$(5x^2 - 2x + 3) + (4x^2 + 7x - 5)$

$$9x^2 + 5x - 2$$

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

Find $(g - f)(x)$

$(4x^2 + 7x - 5) - (5x^2 - 2x + 3)$

$(4x^2 + 7x - 5) + (-5x^2 + 2x - 3)$

$$-x^2 + 9x - 8$$

Let $f(x) = x - 5$ and $g(x) = x^2 - 2x - 15$

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

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

$(x - 5)(x^2 - 2x - 15)$

$\begin{array}{r} x^3 - 2x^2 - 15x \\ + \quad -5x^2 + 10x + 75 \\ \hline x^3 - 7x^2 - 5x + 75 \end{array}$

Dividing Functions
$(f/g)(x) = f(x)/g(x)$

Find $(f/g)(x)$ $\dfrac{f(x)}{g(x)}$ or $\dfrac{f}{g}(x)$

$\dfrac{(x-5)}{x^2 - 2x - 15}$

$\dfrac{(x-5)\,1}{(x-5)(x+3)}$

$$\dfrac{1}{x+3}$$

* The only way to simplify division is to factor + cancel a common factor in numerator + denominator