Mathematical Operations:

- Addition
- Subtraction
- Multiplication
- Division

Sec 7-6:   Function Operations

Definition	Function Operations	
Addition	$(f + g)(x) = f(x) + g(x)$	Combine Like Terms
Multiplication	$(f \cdot g)(x) = f(x) \cdot g(x)$	Expand
Subtraction	$(f - g)(x) = f(x) - g(x)$	Combine Like Terms
Division	$\left(\dfrac{f}{g}\right)(x) = \dfrac{f(x)}{g(x)}, g(x) \neq 0$	Reduce (cancel) which will involve factoring

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State the domain of each function.

1. $g(x) = x - 3$ Domain: $\mathbb{R}$

This is a linear function which has a domain of all real numbers. Also, there is no restriction on the values of x that can by used in this equation (at no time will it become undefined or involve anything but real numbers).

2. $h(x) = x^2 - 10$ Domain: $\mathbb{R}$

The graph of this is a parabola which has a domain of all real numbers. Also, there is no restriction on the values of x that can by used in this equation (at no time will it become undefined or involve anything but real numbers).

3. $f(x) = x^3 - 4x^2 + 2x - 15$ Domain: $\mathbb{R}$

There is no restriction on the values of x that can by used in this equation (at no time will it become undefined or involve anything but real numbers).

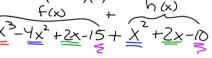Use these three functions:

$f(x) = x^3 - 4x^2 + 2x - 15$ $g(x) = x - 3$ $h(x) = x^2 + 2x - 10$

Perform each function operation. Simplify as much as possible. Write answers in Standard Form. Find the domain of the resulting function.

1. $(g - h)(x)$

$\underbrace{g(x)}_{} - \underbrace{h(x)}_{}$

$x - 3 - (x^2 + 2x - 10)$

$-x^2 - x + 7$

Domain: $\mathbb{R}$

2. $(f + h)(x)$

$\underbrace{f(x)}_{} + \underbrace{h(x)}_{}$

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

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

Domain: $\mathbb{R}$

When adding or subtracting two functions, the resulting domain is the union of the domains of the original functions.