Sec 7-6: Function Operations

Definition	**Function Operations**
Addition	$(f + g)(x) = f(x) + g(x)$
Multiplication	$(f \cdot g)(x) = f(x) \cdot g(x)$
Subtraction	$(f - g)(x) = f(x) - g(x)$
Division	$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}, g(x) \neq 0$

Use these three functions:

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

Perform each function operation. Simplify as much as possible.
Find the domain of the resulting function.

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

$= (x-3) - (2x^2 - x - 15)$

$= x - 3 - 2x^2 + x + 15$

$= -2x^2 + 2x + 12$

Domain: $\mathbb{R}$

Use these three functions:

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

Perform each function operation. Simplify as much as possible.
Find the domain of the resulting function.

2. $(f + h)(x) = (2x^2 - x - 15) + (x^2 + 10)$

$= 2x^2 - x - 15 + x^2 + 10$

$= 3x^2 - x - 150$

Domain: $\mathbb{R}$

Use these three functions:

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

Perform each function operation. Simplify as much as possible.
Find the domain of the resulting function.

3. $(f \cdot h)(x) = (2x^2 - x - 15)(x^2 + 10)$

	$2x^2$	$-x$	-15
x^2	$2x^4$	$-x^3$	$-15x^2$
$+10$	$20x^2$	$-10x$	-150

$= 2x^4 - x^3 + 5x^2 - 10x - 150$

Domain: $\mathbb{R}$

Use these three functions:

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

4. $\left(\frac{g}{h}\right)(x) = \boxed{\dfrac{x-3}{x^2+10}}$ this doesn't reduce

Domain $\mathbb{R}$

Restrictions on the Domain would be when the denominator is zero.

But the denominator will never be equal to zero.

Use these three functions:

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

Perform each function operation. Simplify as much as possible.
Find the domain of the resulting function.

5. $\left(\frac{f}{g}\right)(x) = \dfrac{2x^2 - x -15}{x-3}$

See if the numerator factors:

-30

$-6 \quad 5$

-1

	x	-3
$2x$	$2x^2$	$-6x$
$+5$	$+5x$	-15

$= \dfrac{(2x+5)\cancel{(x-3)}}{\cancel{x-3}}$

The x-3 terms cancel

$= \boxed{2x+5}$

Because there was x-3 in the denominator the domain has a restriction:

Domain: $x \neq 3$