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	$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)},\ g(x) \neq 0$

State the Domain of each function.

	Domain:		Interval Notation:
$f(x) = x^2 + 2x - 15$	Domain:	$\mathbb{R}$	$(-\infty, \infty)$
$g(x) = x - 3$	Domain:	$\mathbb{R}$	$(-\infty, \infty)$
$h(x) = 2x^2 - 18$	Domain:	$\mathbb{R}$	$(-\infty, \infty)$

Use these three functions:

$f(x) = x^2 + 2x - 15$ $\quad g(x) = x - 3$ $\quad h(x) = 2x^2 - 18$

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

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

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

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

$-x^2 - x + 12$

D: $\mathbb{R}$

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

$= (x^2+2x-15) + (2x^2-18)$

$= \boxed{3x^2+2x-33}$

D: $\mathbb{R}$

Use these three functions:

$f(x) = x^2 + 2x - 15$ $\quad g(x) = x - 3$ $\quad h(x) = 2x^2 - 18$

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

3. $(f \cdot h)(x)$

	x^2	$+2x$	-15
$2x^2$	$2x^4$	$+4x^3$	$-30x^2$
-18	$-18x^2$	$-36x$	$+270$

$\boxed{2x^4 + 4x^3 - 48x^2 - 36x + 270}$

D: $\mathbb{R}$

4. $\left(\frac{h}{g}\right)$

$= \frac{2x^2-18}{x-3}$

$= \frac{2(x^2-9)}{x-3}$

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

$2(x+3)$ or $2x+6$

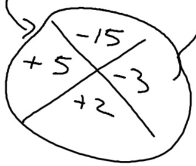
D: $x \neq 3$

Use these three functions:

$f(x) = x^2 + 2x - 15$ $\quad g(x) = x - 3$ $\quad h(x) = 2x^2 - 18$

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

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



$$\boxed{= \frac{1}{x+5} \qquad D: x \neq -5, 3}$$