

**Adding/subtracting/Multiplying/Dividing Functions**

**Perform each function operation. State domain restrictions, if necessary.**

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

a) *adding functions*  $(f + g)(x)$       b) *subtract*  $(f - g)(x)$       *Don't forget to distribute the negative*

$$= 5x^2 - 2x + 3 + 4x^2 + 7x - 5$$

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

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

$$= 5x^2 - 2x + 3 - 4x^2 - 7x + 5$$

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

2.  $f(x) = x^2 - 9$  and  $g(x) = x + 3$

*domain restrictions BEFORE you simplify*

a) *multiplication*  $(f \cdot g)(x)$       b) *division*  $\frac{f}{g}(x)$       c)  $\frac{g}{f}(x)$

$$= (x^2 - 9)(x + 3)$$

$$= x^3 + 3x^2 - 9x - 27$$

*No domain restrictions*

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

*can't divide by 0*

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

*so  $x+3 \neq 0$   
 $x \neq -3$*

$$= x - 3, x \neq -3$$

*domain restriction*

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

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

$$= \frac{1}{x-3}, x \neq \pm 3$$

$$3. f(x) = 5x^2 \text{ and } g(x) = \frac{1}{x^2}$$

multiply

$$a) (f \circ g)(x)$$
$$= 5x^2 \cdot \frac{1}{x^2}$$

$$= 5, x \neq 0$$

$$b) \frac{f}{g}(x) = \frac{5x^2}{\frac{1}{x^2}}$$

$$= 5x^2 \cdot \frac{x^2}{1}$$

$$= 5x^4, x \neq 0$$

domain  
restriction