

## Section 6-6 Function Operations

Students will be able to add, subtract, multiply and divide functions.

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We can add, subtract, multiply and divide functions.

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

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

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

Quotient:  $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$  (also find the restriction for this)

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For example:

Let  $f(x) = 4x^2 + 6x - 9$  and  $g(x) = 6x^2 - x + 2$

Find  $f + g$ :  $f(x) + g(x)$

$$4x^2 + 6x - 9 + 6x^2 - x + 2 =$$

$$10x^2 + 5x - 7$$

Find  $f - g$ :

$$4x^2 + 6x - 9 - (6x^2 - x + 2) =$$

$$-2x^2 + 7x - 11$$

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The domain for function operations is the set of all  $x$  values that are in the domains of both  $f$  and  $g$ .

Find the sum and give the domain.

$f(x) = -2x - 5$        $g(x) = \sqrt{x} + 2x$

$$f + g = -5 + \sqrt{x}$$

Domain:  $x \geq 0$

Feb 21-10:04 AM

Let  $f(x) = 3x^2 - 11x - 4$  and let  $g(x) = 3x + 1$

Find

$f \cdot g$ :  $(3x^2 - 11x - 4)(3x + 1)$

$$9x^3 - 33x^2 - 12x + 3x^2 - 11x - 4$$

$$9x^3 - 30x^2 - 23x - 4$$

$\frac{f}{g} \rightarrow$  factor      D:  $\mathbb{R}$

What are their domains?

$$\frac{3x^2 - 11x - 4}{3x + 1} = \frac{(3x + 1)(x - 4)}{(3x + 1)}$$

$\frac{3x + 1}{3} \neq 0$   
 $\frac{1}{3}$

D:  $\mathbb{R}$ ,  $x \neq -\frac{1}{3}$

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$f(x) = x^2 + 2x - 1$   
 $g(x) = 3x - 5$

Find  $g \circ f$

$$3x - 5 - (x^2 + 2x - 1)$$

$$-x^2 - 2x + 1$$

$$-x^2 + x - 4$$

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$$f(x) = 2x + 5$$

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

$$4f(x) + 2g(x)$$

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

$$8x+20+2x^2-6x+4$$

$$2x^2+2x+24$$

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$$f(x) = x^2 - 1$$

$$g(x) = 3x - 3$$

$$\frac{f}{g} = \frac{x^2-1}{3x-3} = \frac{\cancel{(x-1)}(x+1)}{3\cancel{(x-1)}}$$

$$\boxed{x \neq 1}$$

$$3x-3 \neq 0$$

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

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Homework:

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#10-26 even, 48 - 58 even

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