

## Warm Up

Domain... More Practice... Find the domain of each function.

Click to reveal the answers.

1.  $f(x) = \frac{1}{x+2}$   $(-\infty, -2)(-2, \infty)$

$$x+2=0 \quad x \neq -2$$

2.  $f(x) = \sqrt{x-4}$   $[4, \infty)$

$$x-4 \geq 0 \quad x \geq 4$$

3.  $f(x) = x^3$   $(-\infty, \infty)$

$\mathbb{R}$

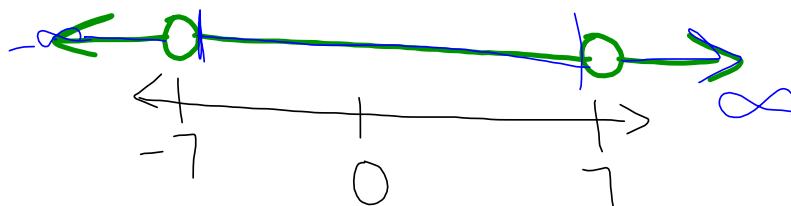
4.  $f(x) = \frac{6}{2x^2-98}$   $(-\infty, -7)(-7, 7)(7, \infty)$

$$2x^2 - 98 = 0$$

$$\frac{2x^2}{2} = \frac{98}{2}$$

$$\sqrt{x^2} = \sqrt{49}$$

$$x \neq \pm 7$$



## 7.6 Function Operations

If  $f(x) = 3x^2 - 6x$  and  $g(x) = 5x + 3$

ADDITION

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

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

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

$$3x^2 - x + 3$$

SUBTRACTION

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

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

$$3x^2 - 6x - (5x + 3)$$

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

$$3x^2 - 11x - 3$$

If  $f(x) = 5x^2 - 4$  and  $h(x) = x+2$ ,

### MULTIPLICATION

Find  $f \cdot h(x)$ .

$$f(x) \cdot h(x) = (5x^2 - 4)(x + 2)$$

$$5x^3 + 10x^2 - 4x - 8$$

### DIVISION

Find  $f(x) \div h(x)$

$$f(x) \div h(x) = \frac{5x^2 - 4}{x + 2}$$

$$x + 2 = 0 \quad x \neq -2$$

Domain?

$$(-\infty, -2) \cup (-2, \infty)$$

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

Find each value.

$$\overbrace{(f+g)}^{+}(-3)$$

$$-3x+2 + -x^2+2x$$

$$-x^2 - x + 2 \Big|_{-3} = -(-3)^2 - (-3) + 2$$

$$\left(\frac{f}{g}\right)(4) \quad \frac{-3x+2}{-x^2+2x} \Big|_4 \quad \frac{-9+3+2}{-12+2} = \frac{-4}{-10} = \frac{2}{5}$$

$$(f-g)(1)$$

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

$$-3x+2 + x^2 - 2x$$

$$x^2 - 5x + 2 \Big|_1$$

$$1 - 5 + 2$$

$$-4 + 2 = \boxed{-2}$$

## HW 7.6 Part I

p. 400 #1-18 all and

p. 404 #1-6 all

$$\textcircled{1} g(x) + h(x)$$

$$\textcircled{5} f(-3)$$

$$\textcircled{2} f(x) - j(x)$$

$$\textcircled{6} g(5)$$

$$\textcircled{3} g(x) - h(x)$$

$$\textcircled{7} j(-4)$$

$$\textcircled{4} \frac{h(x)}{g(x)}$$

$$\textcircled{8} k(7)$$

## Warm up

Simplify.

1.  $8^{\frac{2}{3}}$

2.  $-64^{\frac{5}{6}}$

Solve.

3.  $3 + 2\sqrt{3x+1} = 11$

4.  $\sqrt{x+2} - 3 = 2x$

5. State the domain in interval notation.

$$f(x) = \frac{3x+2}{\cancel{2x^2-7x-8}}$$

$$0 = 2x^2 - 3x - 9$$

$$\begin{array}{r} -18 \\ -6 \times 3 \\ -3 \\ + \end{array} \quad (x-6)(x+3)$$

$$(x-3)(2x+3) = 0$$

$$x \neq 3 \quad x \neq -\frac{3}{2}$$

$$\left(-\infty, -\frac{3}{2}\right) \left(-\frac{3}{2}, 3\right) (3, \infty)$$

6. State the domain and range.

$$\{(3,6), (5,1), (-3,6), (0,0)\}$$

$$D: \{-3, 0, 3, 5\}$$

$$R: \{0, 1, 6\}$$

## Warm up - QUIZ REVIEW

Graph.

1.  $f(x) = \sqrt[3]{x+2} + 1$

2.  $f(x) = -2\sqrt{x-3}$

Solve.

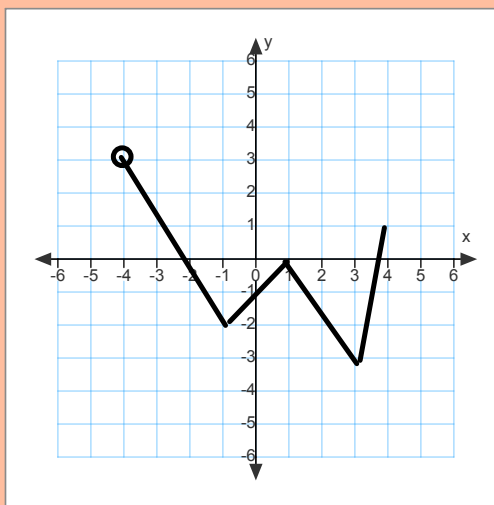
3.  $3 + 2\sqrt{3x+1} = 11$

4.  $\sqrt{x+2} - 3 = 2x$

5. State the domain in interval notation.

$$f(x) = \frac{3x+2}{2x^2+7x-8}$$

6. State the domain and range.



## Function Operations

The composition of the function  $f$  with the function  $g$  is given by:

$$(f \circ g)(x) = f(g(x)).$$

$$f \circ g(x) = f(g(x))$$

Example: If  $f(x) = -4x + 2$  and  $g(x) = x - 3$ , find  $(f \circ g)(x)$

$$f(g(x)) = f(x-3) = -4(x-3) + 2$$

$$-4x + 12 + 2$$

$$\boxed{-4x + 14}$$

Basically, find the composition of  $f(g(x))$

\*\*\*Remember to distribute

Answer: \_\_\_\_\_

Domain: all real numbers



1. If  $f(x) = x^2 - 6$  and  $g(x) = x + 4$ ,  
find  $(f \circ g)(x)$

$$f(g(x)) \quad f(x+4)$$

plug  $g(x)$  into function  $f = \frac{(x+4)^2 - 6}{(x+4)(x+4)}$

Answer:  $\frac{x^2 + 8x + 16 - 6}{x^2 + 8x + 10}$

Domain: all real numbers

## Function Operations... Practice

**If  $f(x) = 4x$  and  $g(x) = x^2 + 5$**

2. Find  $(f \circ g)(-3)$  

$$\begin{aligned} & \underline{f(g(-3))} \quad (-3)^2 + 5 \\ & \cdot \\ & g(-3) = \underline{14} \quad f(14) = 4(14) \end{aligned}$$

Answer: 56

Domain: all real numbers

## Function Operations... Practice

If  $f(x) = 4x$  and  $g(x) = x^2 + 5$

4. Find  $-2g(x) + 3f(x)$

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

$$-2x^2 - 10 + 12x$$

Answer:  $-2x^2 + 12x - 10$

Domain: all real numbers

## HW 7.6 Part II

p. 401

#23-41 odd, 45-49 odd,  
63-67 odd

due Tuesday 1/17

