

Sec 2.6.2

Function Operations

Given  $f(x) = 3 - x^2$  and  $g(x) = x^2 + 2x - 15$

Determine  $f+g$ ,  $f-g$ ,  $fg$ ,  $f/g$

$$\begin{aligned}
 &= 3 - x^2 + x^2 + 2x - 15 && \rightarrow 3 - x^2 - (x^2 + 2x - 15) \\
 &= 2x - 12 && \quad 3 - x^2 - x^2 - 2x + 15 \\
 & && \quad -2x^2 - 2x + 18
 \end{aligned}$$

Determine the domain of  $f/g(x)$ ...

$$\begin{aligned}
 f \cdot g &= (3 - x^2)(x^2 + 2x - 15) \\
 &= 3x^2 + 6x - 45 - x^4 - 2x^3 + 15x^2 \\
 &= -x^4 - 2x^3 + 18x^2 + 6x - 45
 \end{aligned}$$

$$f/g = \frac{3 - x^2}{x^2 + 2x - 15}$$

$$d: g(x) \neq 0$$

$$x^2 + 2x - 15 \neq 0$$

$$(x + 5)(x - 3) \neq 0$$

$$x \neq -5 \text{ \& } 3$$

$$d: (-\infty, -5) \cup (-5, 3) \cup (3, \infty)$$

Given  $f(x) = \sqrt{x+3}$  and  $g(x) = \sqrt{x-2}$

Determine  $f+g$ ,  $f-g$ ,  $fg$ ,  $f/g$  and its domain.

$$f+g = \sqrt{x+3} + \sqrt{x-2}$$

$$x+3 \geq 0 \quad \wedge \quad x-2 \geq 0$$

$$x \geq -3 \quad \quad x \geq 2$$

$$d: [2, \infty)$$

domain

$$f-g = \sqrt{x-3} - \sqrt{x-2}$$

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

$$f/g = \frac{\sqrt{x+3}}{\sqrt{x-2}} \quad d: (2, \infty)$$

Given  $f(x) = \sqrt{x-3}$  and  $g(x) = \sqrt{3-x}$

Determine  $f+g$  and its domain.

Recall- even-rooted  
radicals must be  $\geq 0$

Same notation:

$$(f+g)(x) = \sqrt{x-3} + \sqrt{3-x}$$

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

$$D_f \cap D_g$$

$$x-3 \geq 0$$

$$x \geq 3$$

$$3-x \geq 0$$

$$-x \geq -3$$

$$\text{and } x \leq 3$$

$$d: [3]$$

Given  $f(x) = 5 - \frac{1}{x}$  and  $g(x) = \frac{1}{x}$   $d: x \neq 0$

Determine  $f+g$ ,  $f-g$ ,  $fg$  and  $f/g$  and their domains.

$$f+g = 5 - \frac{1}{x} + \frac{1}{x} = 5 \quad (-\infty, 0) \cup (0, \infty)$$

$$f-g = 5 - \frac{1}{x} - \frac{1}{x} = 5 - \frac{2}{x} \quad (-\infty, 0) \cup (0, \infty)$$

$$fg = \frac{1}{x} \left( 5 - \frac{1}{x} \right) = \frac{5}{x} - \frac{1}{x^2}$$

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

$$\frac{f}{g} = \frac{5 - \frac{1}{x}}{\frac{1}{x}} = x \left( 5 - \frac{1}{x} \right)$$

$$= 5x - 1 \quad d: (-\infty, 0) \cup (0, \infty)$$

Suggested Practice  
Sec 2.6  
page 297-298  
31-50 odds

\*I would not skip 41,43,45,47,49\*

**Answers are lengthy so are in the  
back of the text, pp AA17**



