

# Section 2.6 WS 2

KEY

1. Let  $f(x) = x^2 - 25$ , and  $g(x) = x - 5$ .

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

$$(f+g)(x) = x^2 + x - 30$$

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

$$(f-g)(x) = x^2 - x - 20$$

c.  $(fg)(x)$

$$(fg)(x) = x^3 - 5x^2 - 25x + 125$$

d.  $\left(\frac{f}{g}\right)(x)$

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

2. Let  $f(x) = x^2 - 5x - 8$ , and  $g(x) = -x$ .

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

$$(f+g)(x) = x^2 - 6x - 8$$

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

$$(f-g)(x) = x^2 - 4x - 8$$

c.  $(fg)(x)$

$$(fg)(x) = -x^3 + 5x^2 + 8x$$

d.  $\left(\frac{f}{g}\right)(x)$

$$\left(\frac{f}{g}\right)(x) = -\frac{x^2 - 5x - 8}{x}$$

3. Let  $f(x) = 6x + 10$ , and  $g(x) = 3x^2 + x - 10$ .

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

$$(f+g)(x) = 3x^2 + 7x$$

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

$$(f-g)(x) = -3x^2 + 5x + 20$$

c.  $(fg)(x)$

$$(fg)(x) = 18x^3 + 36x^2 - 50x - 100$$

d.  $\left(\frac{f}{g}\right)(x) = \frac{6x + 10}{3x^2 + x - 10}$

Evaluate the indicate function, where  $f(x) = x^2 - 3x + 2$  and  $g(x) = 2x - 4$ .

4.  $(f+g)(-7) = 54$

5.  $(f+g)\left(\frac{2}{3}\right) = \frac{-20}{9}$

6.  $(f-g)(24) = 462$

7.  $(f-g)(0) = 6$

Evaluate the indicate function, where  $f(x) = x^2 - 3x + 2$  and  $g(x) = 2x - 4$ .

8.  $(fg)(-5) = -588$       9.  $\left(\frac{f}{g}\right)(6) = \frac{5}{2}$       10.  $\left(\frac{f}{g}\right)(-3) = -2$       11.  $(fg)(-100)$   
 $-2, 101, 608$

12. If  $f(x) = 3x - 7$  and  $g(x) = x + 10$ , find the domain of  $f + g, f - g, fg, \frac{f}{g}$ .  
 $D_f (-\infty, \infty) \quad D_g (-\infty, \infty)$

$$D_{f+g}, D_{f-g}, D_{fg} \rightarrow (-\infty, \infty)$$

$$D_{\frac{f}{g}} : \{x \mid x \neq -10\}$$

13. If  $f(x) = x^2 - 9$  and  $g(x) = \sqrt{x - 2}$ , find the domain of  $f + g, f - g, fg, \frac{f}{g}$ .  
 $D_f (-\infty, \infty) \quad D_g \{x \mid x \geq 2\}$

$$D_{f+g}, D_{f-g}, D_{fg} \rightarrow \{x \mid x \geq 2\}$$

$$D_{\frac{f}{g}} : \{x \mid x > 2\}$$

14. If  $f(x) = \sqrt{x + 13}$  and  $g(x) = x^2 - 36$ , find the domain of  $f + g, f - g, fg, \frac{f}{g}$ .  
 $D_f \{x \mid x \geq -13\} \quad D_g (-\infty, \infty)$

$$\frac{\sqrt{x+13}}{x^2-36} \quad D_g \{x \mid x \neq \pm 6\}$$

$$D_{f+g}, D_{f-g}, D_{fg} \rightarrow \{x \mid x \geq -13\}$$

$$D_{\frac{f}{g}} : [-13, -6) \cup (-6, 6) \cup (6, \infty)$$

5. If  $f(x) = 2x - 7$  and  $g(x) = 3x + 2$ , find  $(f \circ g)(x)$  and  $(g \circ f)(x)$  for the given functions.

$$f(g(x)) = 6x - 3 \quad g(f(x)) = 6x - 19$$

16. If  $f(x) = x^2 + 4x - 1$  and  $g(x) = x + 2$ , find  $(f \circ g)(x)$  and  $(g \circ f)(x)$  for the given functions.

$$f(g(x)) = x^2 + 8x + 11 \quad g(f(x)) = x^2 + 4x + 1$$

17. If  $f(x) = \sqrt{x+4}$  and  $g(x) = \frac{1}{x}$ , find  $(f \circ g)(x)$  and  $(g \circ f)(x)$  for the given functions.

$$f(g(x)) = \frac{\sqrt{x+4x^2}}{x} \quad g(f(x)) = \frac{\sqrt{x+4}}{x+4}$$

Evaluate each composition function, where  $f(x) = 2x + 3$ ,  $g(x) = x^2 - 5x$ , and  $h(x) = 4 - 3x^2$ .

18. $(f \circ g)(4)$	19. $(g \circ f)(-1)$	20. $(f \circ f)(-8)$	21. $(g \circ h)\left(-\frac{1}{3}\right)$	22. $(g \circ f)(\sqrt{3})$
-5	-4	-23	$-\frac{44}{9}$	$6 + 2\sqrt{3}$