

Section 2.6 WS

Key

1. Let $f(x) = x^2 - 2x - 15$, and $g(x) = x + 3$.

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

$$(f+g)(x) = x^2 - x - 12$$

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

$$(f-g)(x) = x^2 - 3x - 18$$

c. $(fg)(x)$

$$(fg)(x) = x^3 + x^2 - 21x - 45$$

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

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

2. Let $f(x) = 2x + 8$, and $g(x) = x + 4$.

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

$$(f+g)(x) = 3x + 12$$

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

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

c. $(fg)(x)$

$$(fg)(x) = 2x^2 + 16 + 32$$

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

$$\left(\frac{f}{g}\right)(x) = 2$$

3. Let $f(x) = x^3 - 2x^2 + 7x$, and $g(x) = x$.

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

$$(f+g)(x) = x^3 - 2x^2 + 8x$$

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

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

c. $(fg)(x)$

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

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

$$\left(\frac{f}{g}\right)(x) = x^2 - 2x + 7$$

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

4. $(f+g)(5)$

$$(f+g)(5) = 18$$

5. $(f+g)\left(\frac{1}{2}\right)$

$$(f+g)\left(\frac{1}{2}\right) = -\frac{9}{4}$$

6. $(f-g)(-3) = 30$

7. $(f-g)(-1) = 12$

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

8. $(fg)(7) = 300$

9. $\left(\frac{f}{g}\right)(-4) = \frac{-5}{2}$

10. $\left(\frac{f}{g}\right)(11) = 5$

11. $(fg)(-3) = -200$
 -200

12. If $f(x) = 2x + 8$ and $g(x) = x + 4$, find the domain of $f + g, f - g, fg, \frac{f}{g}$.

$$\frac{2x+8}{x+4}$$

$D_f (-\infty, \infty) \quad D_g (-\infty, \infty)$

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

$D_{\frac{f}{g}} \{x \mid x \neq -4\}$

13. If $f(x) = x^2 - 16$ and $g(x) = \sqrt{x+4}$, find the domain of $f + g, f - g, fg, \frac{f}{g}$.

$$\frac{x^2-16}{\sqrt{x+4}}$$

$D_f (-\infty, \infty) \quad D_g \{x \mid x \geq -4\}$

$D_{f+g}, D_{f-g}, D_{fg} \{x \mid x \geq -4\}$

$D_{\frac{f}{g}} \{x \mid x > -4\}$

14. If $f(x) = \sqrt{x+8}$ and $g(x) = x^2 - 9$, find the domain of $f + g, f - g, fg, \frac{f}{g}$.

$D_f \{x \mid x \geq -8\} \quad D_g (-\infty, \infty)$

$D_{f+g}, D_{f-g}, D_{fg} \{x \mid x \geq -8\}$

$D_{\frac{f}{g}} [-8, -3) \cup (-3, 3) \cup (3, \infty)$

or
 $D_{\frac{f}{g}} : \{x \mid x \geq -8, x \neq -3 \text{ and } x \neq 3\}$

15. If $f(x) = 3x + 5$ and $g(x) = 2x - 7$, find ~~the domain of~~ $(f \circ g)(x)$ and $(g \circ f)(x)$.

$$f(g(x)) = 3(2x - 7) + 5$$

$$f(g(x)) = 6x - 21 + 5$$

$$f(g(x)) = 6x - 16$$

$$g(f(x)) = 2(3x + 5) - 7$$

$$g(f(x)) = 6x + 10 - 7$$

$$g(f(x)) = 6x + 3$$

16. If $f(x) = x^2 - 11x$ and $g(x) = x + 2$, find ~~the domain of~~ $(f \circ g)(x)$ and $(g \circ f)(x)$.

$$f(g(x)) = (x+2)^2 - 11(x+2)$$

$$f(g(x)) = x^2 + 4x + 4 - 11x - 22$$

$$f(g(x)) = x^2 - 7x - 18$$

$$g(f(x)) = x^2 - 11x + 2$$

17. If $f(x) = -x^3 - 7$ and $g(x) = x + 1$, find ~~the domain of~~ $(f \circ g)(x)$ and $(g \circ f)(x)$.

$$f(g(x)) = -(x+1)^3 - 7$$

$$f(g(x)) = -x^3 - 3x^2 - 3x - 8$$

$$g(f(x)) = -x^3 - 7 + 1$$

$$g(f(x)) = -x^3 - 6$$

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

18. $(g \circ f)(4)$

$$g(f(4)) =$$

$$g(5) = (5)^2 - 5(5)$$

$$g(f(4)) = 0$$

19. $(f \circ g)(-3)$

$$f(g(-3)) =$$

$$f(24) =$$

$$f(g(-3)) = 45$$

20. $(g \circ h)(0)$

$$g(h(0)) =$$

$$g(4) = -4$$

$$g(h(0)) = -4$$

21. $(f \circ f)(8)$

$$f(f(8)) =$$

$$f(13) =$$

$$f(f(8)) = 23$$

22. $(g \circ f)(2c)$

$$g(f(2c)) =$$

$$g(4c - 3) =$$

$$g(f(2c)) = 16c^2 - 44c + 24$$