

6.4 Practice Set

1. What is the geometric meaning of adding two functions together?
2. What is composition of functions and how does it work? Give an example.

For each of the following pairs of functions, perform the following operations and give any restrictions on the domain of the resulting function:

$(f + g)(x)$, $(f - g)(x)$, $(f \cdot g)(x)$, and $(\frac{f}{g})(x)$.

3.
$$\begin{cases} f(x) = x + 5 \\ g(x) = 3x - 2 \end{cases}$$

4.
$$\begin{cases} f(x) = x^2 - 4 \\ g(x) = 5x \end{cases}$$

5.
$$\begin{cases} f(x) = \sqrt{x - 5} \\ g(x) = x + 2 \end{cases}$$

6.
$$\begin{cases} f(x) = -4x + 1 \\ g(x) = 2x^2 - 3 \end{cases}$$

7.
$$\begin{cases} f(x) = \frac{x+1}{x-2} \\ g(x) = 7x + 2 \end{cases}$$

For each of the following pairs of functions, find the compositions $(f \circ g)(x)$ and $(g \circ f)(x)$ and give any restrictions on the domain of the resulting function.

$$8. \quad \begin{cases} f(x) = -x^2 + 5x - 1 \\ g(x) = 2x \end{cases}$$

$$9. \quad \begin{cases} f(x) = x^2 - 2x + 4 \\ g(x) = 3x + 1 \end{cases}$$

$$10. \quad \begin{cases} f(x) = \sqrt{x} \\ g(x) = 4x \end{cases}$$

$$11. \quad \begin{cases} f(x) = \frac{\sqrt{2x+1}}{x} \\ g(x) = \frac{1}{x^2} \end{cases}$$

$$12. \quad \begin{cases} f(x) = 2^x \\ g(x) = \log_2 x \end{cases}$$

$$13. \quad \begin{cases} f(x) = e^{x-1} \\ g(x) = 3\ln(x) \end{cases}$$

$$14. \quad \text{Find } (f \circ g)(3) \text{ for } f(x) = \sqrt[3]{x-1} \text{ and } g(x) = \frac{1}{x^3}$$

$$15. \quad \text{Find } (h \circ k)(-1) \text{ for } h(t) = t^2 + t \text{ and } k(t) = -2t$$

Distributed Practice Problems

Graph each of the following relations. Give the x-intercept(s), y-intercept, domain, range, and the equation(s) of any asymptote(s).

16. $y = -4x^2 - 12x - 8$

17. $y = |x - 3| + 4$

18. $y = \log_4(x + 1) - 2$

19. $\frac{x^2}{4} - \frac{(y+2)^2}{9} = 1$

20. $4(x + 2)^2 + 9(y - 1)^2 = 36$

Find the equation of the line using the given information. Write your answer in both slope-intercept form and in standard form when possible.

21. Containing $(-2, 4)$ and $(-1, -5)$

22. Containing $(3, -5)$; parallel to the line $4x - 2y = 6$

Solve each of the following inequalities. Graph the solution on a number line and write it in interval notation.

23. $-2|x - 3| + 18 \geq 12$

24. $5x^3 - 2x^2 - 3x < 0$

25. $\frac{x^2 - 8x + 16}{x^2 - 9} \geq 0$