Math 120: Section 2.8 Exercises

For #1 – 6, find $f+g$, $f-g$, fg, f/g, and their domains.

1. $f(x) = \sqrt{1-x}, \quad g(x) = \dfrac{1}{x-2}$
2. $f(x) = \sqrt{10+x}, \quad g(x) = \sqrt{50-x}$
3. $f(x) = \sqrt{9-x^2}, \quad g(x) = \sqrt{x^2-1}$
4. $f(x) = \dfrac{2}{x+2}, \quad g(x) = \dfrac{x}{x+2}$
5. $f(x) = \dfrac{1}{\sqrt{2x-3}}, \quad g(x) = 3x^2 - 8$
6. $f(x) = \sqrt[6]{3-x}, \quad g(x) = \sqrt[4]{x-5}$

For #7 – 12, find $f \circ g$, $g \circ f$, $f \circ f$, $g \circ g$, and their domains.

7. $f(x) = 3x^2 - 7, \quad g(x) = x + 5$
8. $f(x) = \sqrt{x-3}, \quad g(x) = x^2$
9. $f(x) = \dfrac{1}{x-1}, \quad g(x) = \dfrac{x-1}{x+1}$
10. $f(x) = \sqrt[3]{x}, \quad g(x) = 1 - \sqrt{x}$
11. $f(x) = \sqrt{x^2-4}, \quad g(x) = \sqrt{2-x}$
12. $f(x) = \dfrac{1}{\sqrt[4]{x}}, \quad g(x) = x^2 - 4x$

For #13 – 14, find $f \circ g \circ h$ and its domain.

13. $f(x) = \sqrt{x-2}, \quad g(x) = \sqrt[4]{x-1}, \quad h(x) = \sqrt[3]{x+3}$
14. $f(x) = \sqrt{2x}, \quad g(x) = \dfrac{x}{x-1}, \quad h(x) = \sqrt[5]{x}$

For #15 – 18, find simple functions that do the job of the complex function.

15. $H(x) = (x-8)^4$. Find functions f and g so that $f \circ g = H$.
16. $L(x) = \dfrac{1}{5x-3}$. Find functions f and g so that $f \circ g = L$.
17. $\Phi(x) = \sqrt[3]{\sqrt{x}-1}$. Find functions f, g and h so that $f \circ g \circ h = \Phi$.
18. $W(x) = \dfrac{9}{(4-\sqrt{x})^2}$. Find functions f, g and h so that $f \circ g \circ h = W$.