Find $f \circ g$, $g \circ f$, and the domain of each for the following functions.

1. $f(x) = x + 3$ $\quad g(x) = \sqrt{9 - x^2}$

2. $f(x) = \sqrt{x + 3}$ $\quad g(x) = 2x - 5$

3. $f(x) = \dfrac{-3}{x}$ $\quad g(x) = \dfrac{x}{x - 2}$

4. $f(x) = x^2 + 2$ $\quad g(x) = \sqrt{x - 5}$

5. $f(x) = \dfrac{2}{x - 3}$ $\quad g(x) = \dfrac{5}{x + 2}$

6. $f(x) = \dfrac{1}{\sqrt[3]{x} - 2}$ $\quad g(x) = x^2 - 3$

In Exercises 15–22, find $f(g(x))$ and $g(f(x))$. State the domain of each.

15. $f(x) = 3x + 2;\ g(x) = x - 1$

16. $f(x) = x^2 - 1;\ g(x) = \dfrac{1}{x - 1}$

17. $f(x) = x^2 - 2;\ g(x) = \sqrt{x + 1}$

18. $f(x) = \dfrac{1}{x-1}; g(x) = \sqrt{x}$

19. $f(x) = x^2; g(x) = \sqrt{1-x^2}$

20. $f(x) = x^3; g(x) = \sqrt[3]{1-x^3}$

21. $f(x) = \dfrac{1}{2x}; g(x) = \dfrac{1}{3x}$

22. $f(x) = \dfrac{1}{x+1}; g(x) = \dfrac{1}{x-1}$