18. (a) $f(f(4)) = f(3(4) - 5) = f(7) = 3(7) - 5 = 16$

(b) $g(g(3)) = g(2 - (3)^2) = g(-7) = 2 - (-7)^2 = -47$

20. (a) $(f \circ f)(-1) = f(f(-1)) = f(3(-1) - 5) = f(-8) = 3(-8) - 5 = -29$

(b) $(g \circ g)(2) = g(g(2)) = g(2 - (2)^2) = g(-2) = 2 - (-2)^2 = -2$

22. (a) $(f \circ f)(x) = f(f(x)) = f(3x - 5) = 3(3x - 5) - 5 = 9x - 15 - 5 = 9x - 20$

(b) $(g \circ g)(x) = g(g(x)) = g(2 - x^2) = 2 - (2 - x^2)^2 = 2 - (4 - 4x^2 + x^4) = -x^4 + 4x^2 - 2$

24. $f(0) = 0$, so $g(f(0)) = g(0) = 3$.

26. $g(0) = 3$, so $(f \circ g)(0) = f(3) = 0$.

28. $f(4) = 2$, so $(f \circ f)(4) = f(2) = -2$.

30. $f(x) = 6x - 5$ has domain $(-\infty, \infty)$. $g(x) = \dfrac{x}{2}$ has domain $(-\infty, \infty)$.

$(f \circ g)(x) = f\left(\dfrac{x}{2}\right) = 6\left(\dfrac{x}{2}\right) - 5 = 3x - 5$, and the domain is $(-\infty, \infty)$.

$(g \circ f)(x) = g(6x - 5) = \dfrac{6x - 5}{2} = 3x - \dfrac{5}{2}$, and the domain is $(-\infty, \infty)$.

$(f \circ f)(x) = f(6x - 5) = 6(6x - 5) - 5 = 36x - 35$, and the domain is $(-\infty, \infty)$.

$(g \circ g)(x) = g\left(\dfrac{x}{2}\right) = \dfrac{\frac{x}{2}}{2} = \dfrac{x}{4}$, and the domain is $(-\infty, \infty)$.

32. $f(x) = x^3 + 2$ has domain $(-\infty, \infty)$. $g(x) = \sqrt[3]{x}$ has domain $(-\infty, \infty)$.

$(f \circ g)(x) = f\left(\sqrt[3]{x}\right) = \left(\sqrt[3]{x}\right)^3 + 2 = x + 2$, and the domain is $(-\infty, \infty)$.

$(g \circ f)(x) = g(x^3 + 2) = \sqrt[3]{x^3 + 2}$ and the domain is $(-\infty, \infty)$.

$(f \circ f)(x) = f(x^3 + 2) = (x^3 + 2)^3 + 2 = x^9 + 6x^6 + 12x^3 + 8 + 2 = x^9 + 6x^6 + 12x^3 + 10$, and the domain is $(-\infty, \infty)$.

$(g \circ g)(x) = g\left(\sqrt[3]{x}\right) = \sqrt[3]{\sqrt[3]{x}} = \left(x^{1/3}\right)^{1/3} = x^{1/9}$, and the domain is $(-\infty, \infty)$.

34. $f(x) = x^2$ has domain $(-\infty, \infty)$. $g(x) = \sqrt{x - 3}$ has domain $[3, \infty)$.

$(f \circ g)(x) = f\left(\sqrt{x - 3}\right) = \left(\sqrt{x - 3}\right)^2 = x - 3$, and the domain is $[3, \infty)$.

$(g \circ f)(x) = g(x^2) = \sqrt{x^2 - 3}$. For the domain we must have $x^2 \geq 3 \quad \Rightarrow \quad x \leq -\sqrt{3}$ or $x \geq \sqrt{3}$. Thus the domain is $(-\infty, -\sqrt{3}] \cup [\sqrt{3}, \infty)$.