Math 27, HW #8 Selected Problems

Pg. 57, #42 $f(x) = \sqrt[3]{x-1}$, $g(x) = x^3 + 1$

a) $(f \circ g)(x) = f(g(x)) = f(x^3+1) = \sqrt[3]{(x^3+1)-1} = \sqrt[3]{x^3} = x$.

b) $(g \circ f)(x) = g(f(x)) = g\left(\sqrt[3]{x-1}\right) = \left(\sqrt[3]{x-1}\right)^3 + 1 = x - 1 + 1 = x$.

c) $(f \circ g)(0) = 0$

Pg. 57, #47 $f(x) = x^2 + 1$, $g(x) = \sqrt{x}$

a) Domain of f: $\mathbb{R}$ or $(-\infty, \infty)$

b) Domain of g: $[0, \infty)$ or $x \geq 0$

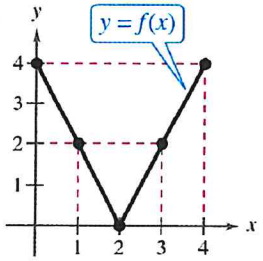
c) $(f \circ g)(x) = f(g(x)) = f(\sqrt{x}) = (\sqrt{x})^2 + 1 = x + 1$

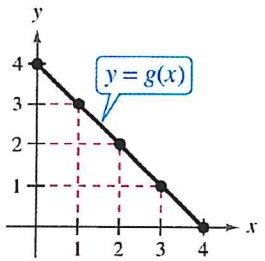
Domain of $f \circ g$: $[0, \infty)$

Pg. 57, #70

a) $(f \circ g)(1) = f(g(1)) = f(3) = \boxed{2}$

b) $(g \circ f)(3) = g(f(3)) = g(2) = \boxed{2}$





Pg. 58, #81

a) $r(x) = \frac{1}{2}x$

b) $A(r) = \pi r^2$

c) $(A \circ r)(x) = A(r(x)) = A\left(\frac{1}{2}x\right)$

$= \pi\left(\frac{1}{2}x\right)^2$

$= \frac{\pi x^2}{4}$

Area of the circular base as a function of the length of the side of the square.

81. **Geometry** A square concrete foundation was prepared as a base for a large cylindrical gasoline tank (see figure).

(a) Write the radius r of the tank as a function of the length x of the sides of the square.

(b) Write the area A of the circular base of the tank as a function of the radius r.

(c) Find and interpret $(A \circ r)(x)$.