

Exercise 16

Evaluate each expression using the functions

$$f(x) = 2 - x, \quad g(x) = \begin{cases} -x, & -2 \leq x < 0 \\ x - 1, & 0 \leq x \leq 2. \end{cases}$$

- a. $f(g(0))$ b. $g(f(3))$ c. $g(g(-1))$
d. $f(f(2))$ e. $g(f(0))$ f. $f(g(1/2))$

Solution

- a. $f(g(0)) = f(0 - 1) = f(-1) = 2 - (-1) = 3$
b. $g(f(3)) = g(2 - 3) = g(-1) = -(-1) = 1$
c. $g(g(-1)) = g(-(-1)) = g(1) = 1 - 1 = 0$
d. $f(f(2)) = f(2 - 2) = f(0) = 2 - 0 = 2$
e. $g(f(0)) = g(2 - 0) = g(2) = 2 - 1 = 1$
f. $f(g(1/2)) = f\left(\frac{1}{2} - 1\right) = f\left(-\frac{1}{2}\right) = 2 - \left(-\frac{1}{2}\right) = \frac{5}{2}$