

1. Let $f(x) = 3x + 1$, $g(x) = x^2 - 2x - 4$, and $h(x) = \frac{x}{4}$.
Compute the following and simplify.

(a) $(f + g)(x)$

(b) $(f - g)(x)$

(c) $(f - g)(10)$

(d) $(fg)(x)$

(e) $(hf)(x)$

(f) $(fg)(-1) + (hf)(1)$

(g) $\left(\frac{f}{g}\right)(0)$

(h) $(f \circ h)(x)$

(i) $(h \circ f)(x)$

(j) $\frac{f(b) - f(a)}{b - a}$

2. Let $f(x) = 5x^2$, $g(x) = \frac{1}{1 - 2x}$, and $h(x) = |x|$.
Compute the following and simplify.

(a) $(g \circ f)(x)$

(b) $(f \circ g)(x)$

(c) $(h \circ f)(x)$

(d) $(f \circ g \circ f)(x)$

3. Write each function as a composition of two simpler functions. (Answers may vary.)

(a) $\sqrt{2x + 1}$

(b) $\frac{1}{x - 4}$

(c) $\frac{x^2 - 3}{x^2 - 1}$

(d) $16x^2$

4. Write each function as a composition of three simpler functions. (Answers may vary.)

(a) $(5x - 2)^3$

(b) $\frac{2}{\sqrt[3]{x + 4}}$