

Composite Functions Assignment

1. Given $f(2) = 3, f(3) = 4, f(5) = 0, g(2) = 5, g(3) = 2$ and $g(4) = -1$, evaluate the following:

a) $f(g(3))$

b) $f(g(2))$

c) $g(f(2))$

d) $g(f(3))$

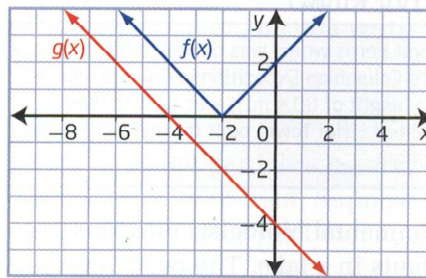
2. Use the graphs of $f(x)$ and $g(x)$ to evaluate the following:

a) $f(g(-4))$

b) $f(g(0))$

c) $g(f(-2))$

d) $g(f(-3))$



3. If $f(x) = 2x + 8$, $g(x) = 3x - 2$, and $j(x) = \{(3, 4), (1, -3), (4, -2)\}$ determine each of the following:

a) $f(g(3))$

e) $f(j(4))$

b) $f(g(-2))$

f) $j(g(1))$

c) $g(f(-4))$

g) $j(j(3))$

d) $g(f(1))$

h) $g(g(-2))$

4. For each pair of functions, $f(x)$ and $g(x)$, determine the equation for:

i. $y = f(g(x))$

ii. $y = g(f(x))$

a) $f(x) = x^2 + x$ and $g(x) = x^2 + x$

b) $f(x) = \sqrt{x^2 + 2}$ and $g(x) = x^2$

5. Given $f(x) = \frac{3}{x}$ and $g(x) = \sqrt{5-x}$. Determine an explicit equation for each of the following functions:

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

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

c) $(g \circ g)(x)$

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

6. Two functions $f(x)$ and $g(x)$ are inverses of each other if and only if $f(g(x)) = x$ and $g(f(x)) = x$. Verify that the pairs of functions are inverses of each other.

a) $f(x) = \frac{x-1}{2}$ and $g(x) = 2x + 1$

b) $f(x) = \sqrt[3]{x+1}$ and $g(x) = x^3 - 1$

c) $f(x) = 5^x$ and $g(x) = \log_5 x$

Answers

1. a) 3 b) 0 c) 2 d) -1

2. a) 2 b) 2 c) -4 d) -5

3. a) 22 b) -8 c) -2 d) 28
e) 4 f) -3 g) -2 h) -26

4. a) $f(g(x)) = x^4 + 2x^3 + 2x^2 + x$, $g(f(x)) = x^4 + 2x^3 + 2x^2 + x$

b) $f(g(x)) = \sqrt{x^4 + 2}$, $g(f(x)) = x^2 + 2$

5. a) $(f \circ g)(x) = \frac{3}{\sqrt{5-x}}$, $x \neq 5$

b) $(g \circ f)(x) = \sqrt{5 - \frac{3}{x}}$, $x \neq 0$

c) $(g \circ g)(x) = \sqrt{5 - \sqrt{5-x}}$

d) $(f \circ f)(x) = x$, $x \neq 0$