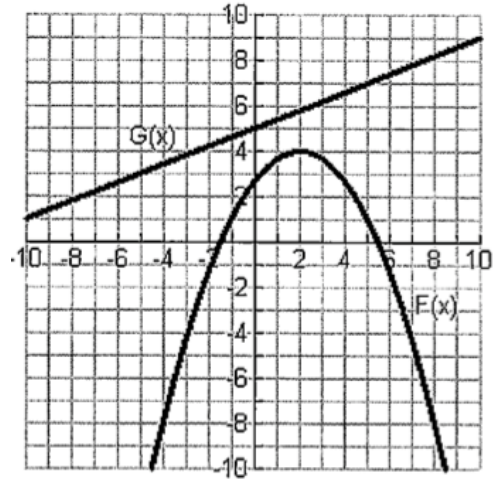


Restrictions on Composite Functions Assignment

1. Use the graph to evaluate the following questions:

- a) $g(f(5))$
- b) $f(g(0))$
- c) What is the domain of $(g \circ f)(x)$?

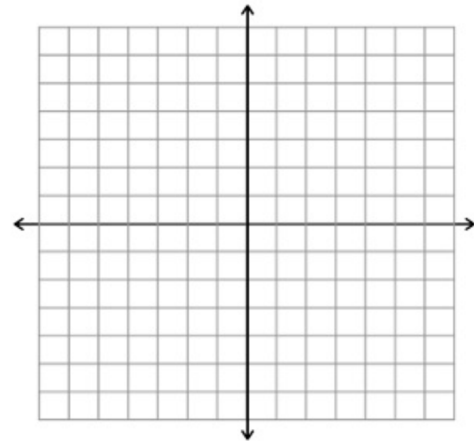
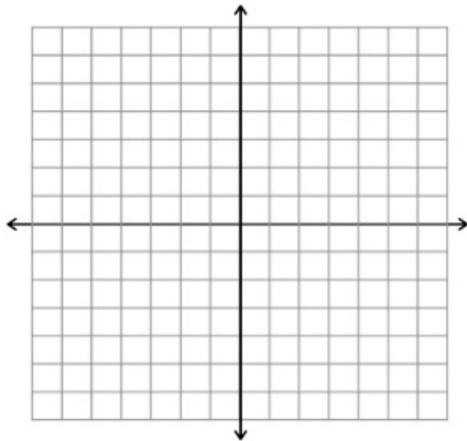


2. Given the following functions: $f(x) = \sqrt{x}$ and $h(x) = x^2$

- a) Sketch the graph of $f(h(x))$
- b) Sketch the graph of $h(f(x))$

x	$f(x)$	$h(x)$	$f(h(x))$

x	$f(x)$	$h(x)$	$h(f(x))$



c) State the domain and range for each

3. For each of the following composite functions determine the explicit equation and the domain:

i. $f(g(x))$

ii. $(g \circ f)(x)$

a) $f(x) = \frac{1}{x+2}$ and $g(x) = \frac{2}{x-3}$

b) $f(x) = 2x + 3$ and $g(x) = -x^2 + 5$

c) $f(x) = \sqrt{x}$ and $g(x) = x - 2$

d) $f(x) = \frac{1}{\sqrt{x}}$ and $g(x) = 2x - 1$

e) $f(x) = \frac{1}{x}$ and $g(x) = 1 - x$

f) $f(x) = x^2$ and $g(x) = \sqrt{x-1}$

g) $f(x) = x^2 - 3$ and $g(x) = \sqrt{4-x}$

4. For each of the following, determine possible functions for $f(x)$ and $g(x)$ so that $h(x) = f(g(x))$

a) $h(x) = (x + 1)^2 + 2(x + 1) - 3$

b) $h(x) = \sqrt{4x + 1}$

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

d) $h(x) = |8 - x^7|$

e) $h(x) = \frac{4}{x^2+7}$

f) $h(x) = 4|3 - x| + 2$

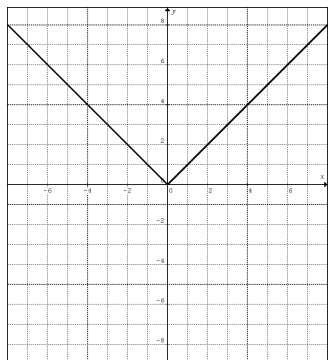
Answers

1. a) 5.5

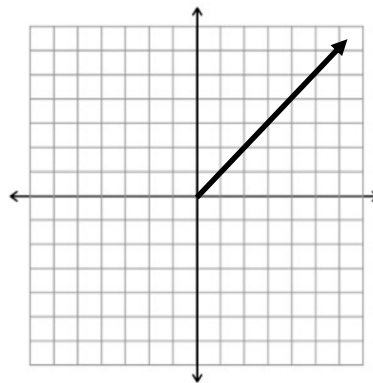
b) 1

c) $x \in \mathbb{R}$

2. a) $D: x \in \mathbb{R}$



b) $D: x \geq 0$



3. a) i) $f(g(x)) = \frac{x-3}{2x-4}, D: x \neq 3, 2$

b) i) $f(g(x)) = -2x^2 + 13, D: x \in \mathbb{R}$

c) i) $f(g(x)) = \sqrt{x-2}, D: x \geq 2$

d) i) $f(g(x)) = \frac{1}{\sqrt{2x-1}}, D: x > \frac{1}{2}$

e) i) $f(g(x)) = \frac{1}{1-x}, D: x \neq 1$

f) i) $f(g(x)) = x - 1, D: x \geq 1$

g) i) $f(g(x)) = 1 - x, D: x \leq 4$

ii) $g(f(x)) = \frac{2(x+2)}{-3x-5}, D: x \neq -2, -\frac{5}{3}$

ii) $g(f(x)) = -4x^2 - 12x - 4, D: x \in \mathbb{R}$

ii) $g(f(x)) = \sqrt{x} - 2, D: x \geq 0$

ii) $g(f(x)) = \frac{2}{\sqrt{x}} - 1, D: x > 0$

ii) $g(f(x)) = 1 - \frac{1}{x}, D: x \neq 0$

ii) $g(f(x)) = \sqrt{x^2 - 1}, D: x \leq -1, x \geq 1$

ii) $g(f(x)) = \sqrt{-x^2 + 7}, D: -\sqrt{7} \leq x \leq \sqrt{7}$

4. a) $f(x) = x^2 + 2x - 3, g(x) = x + 1$

b) $f(x) = \sqrt{x}, g(x) = 4x + 1$

c) $f(x) = \frac{1}{x^3}, g(x) = x - 3$

d) $f(x) = |x|, g(x) = 8 - x^7$

e) $f(x) = \frac{4}{x}, g(x) = x^2 + 7$

f) $f(x) = 4|x| + 2, g(x) = 3 - x$