

## Combinations of Functions and Inverse Functions Worksheet

This document was composed and formatted by Annie Bernatchez.

The course material originated from [www.jensenmath.ca](http://www.jensenmath.ca)

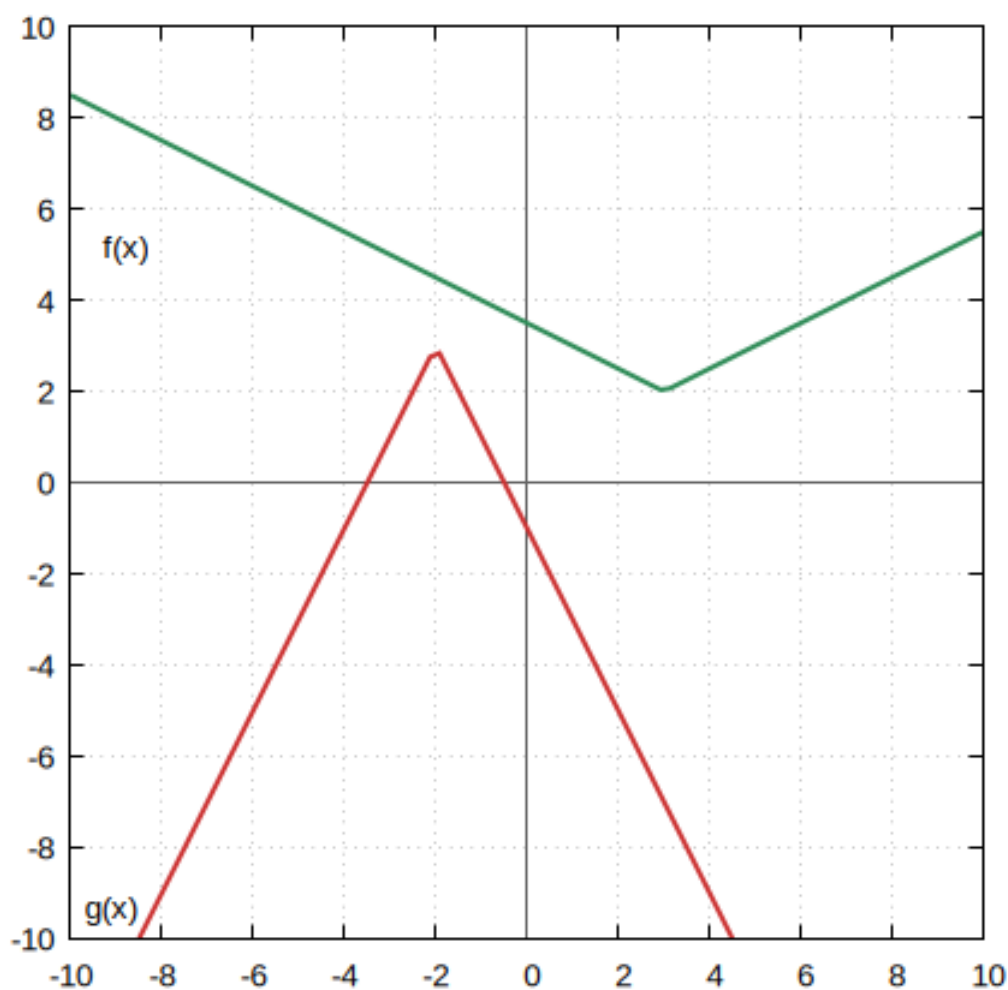
1) Let  $f(x) = 3x - 5$  and  $g(x) = 2x + 3$ .

a) Write the equation for  $h(x) = f(x) + g(x)$  and determine the value of  $h(2)$ .

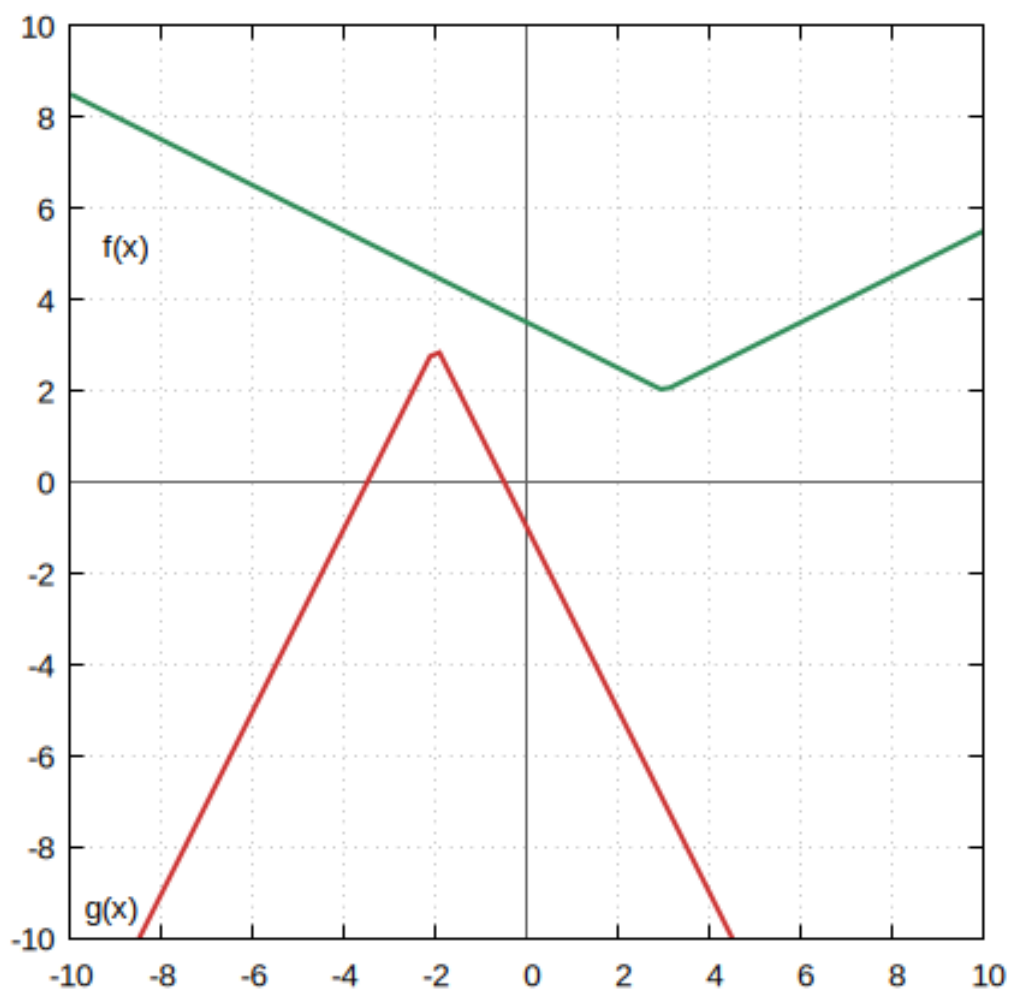
b) Write the equation for  $k(x) = f(x) - g(x)$  and determine the value of  $k(2)$ .

2) Use the functions  $f(x)$  and  $g(x)$  as shown. Apply the superposition principle to graph

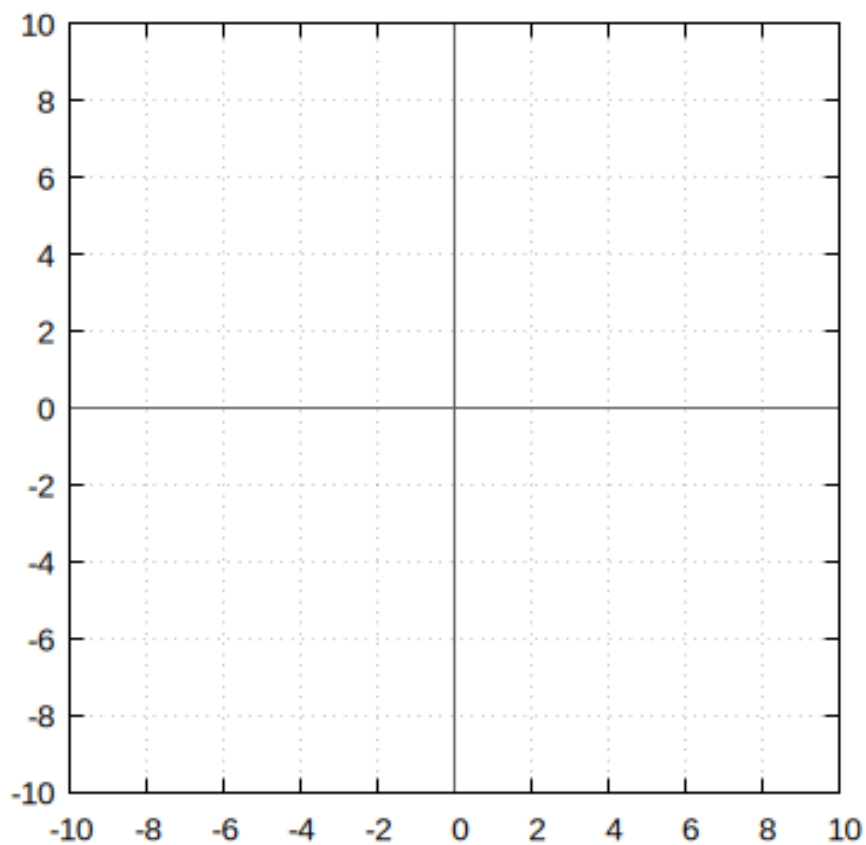
a)  $y = f(x) + g(x)$



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

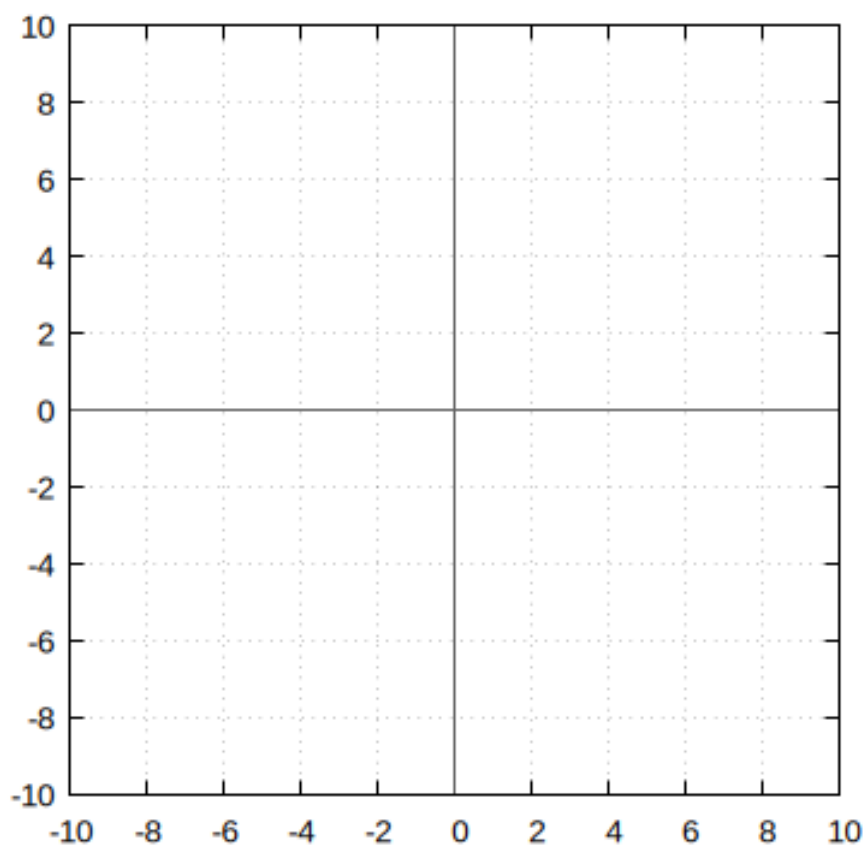


3) Let  $f(x) = x - 2$  and  $g(x) = x^2 + 3x - 3$ . Determine an algebraic and graphical model for  $h(x) = f(x) + g(x)$ .

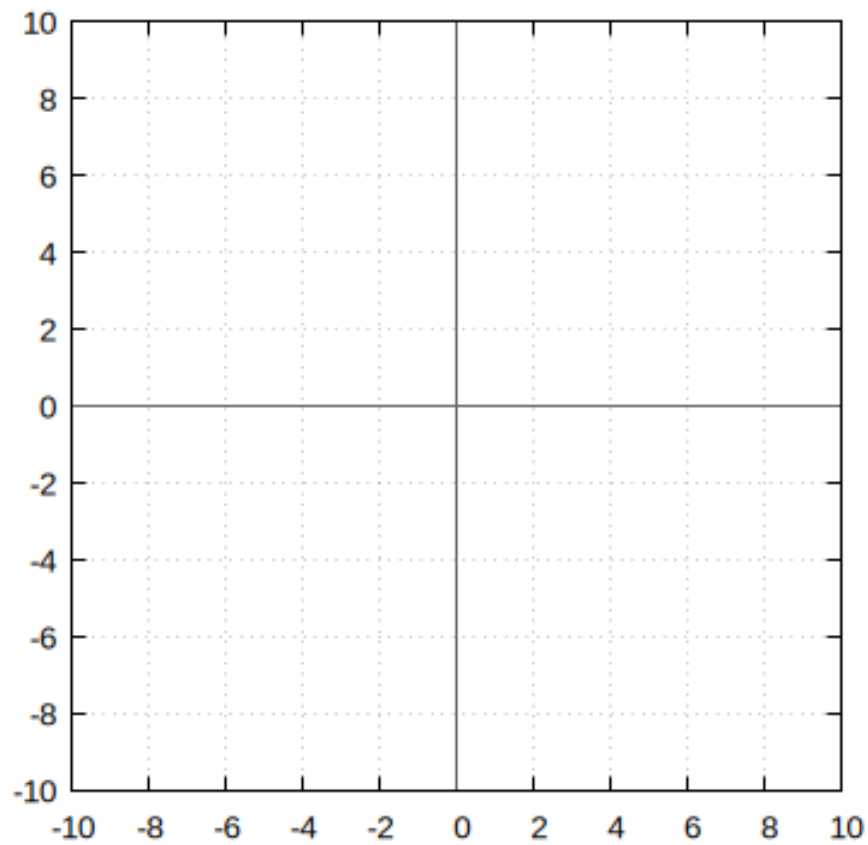


4) Let  $f(x) = x - 2$  and  $g(x) = x^2 - 4$ . Develop an algebraic and graphical model for each of the following:

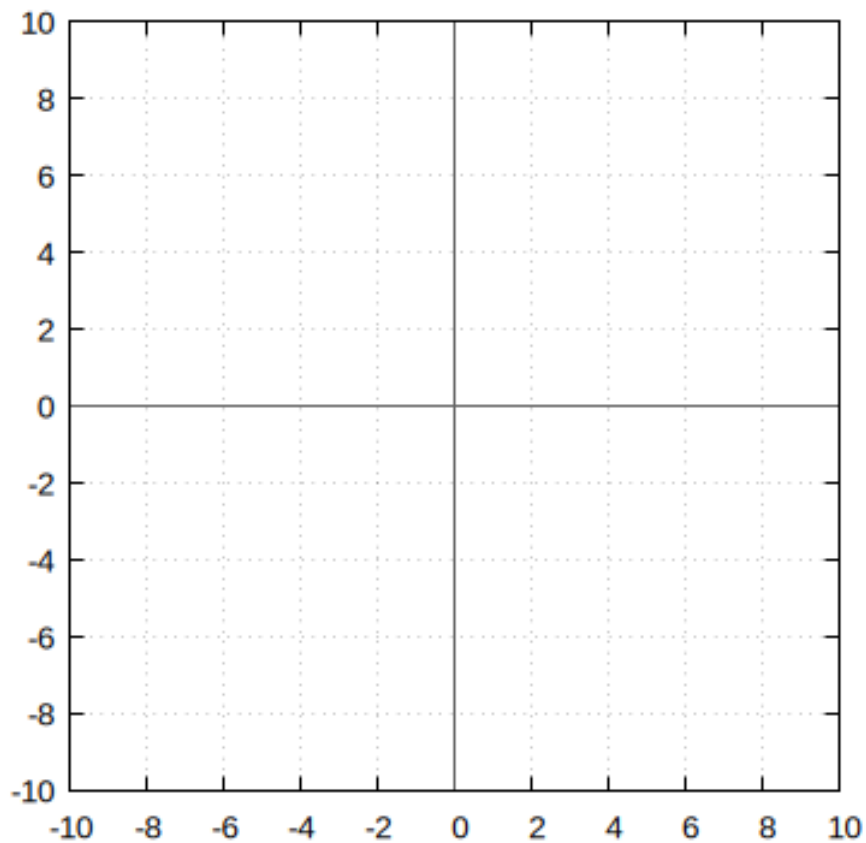
a)  $y = f(x)g(x)$



b)  $y = \frac{f(x)}{g(x)}$



c)  $y = \frac{g(x)}{f(x)}$



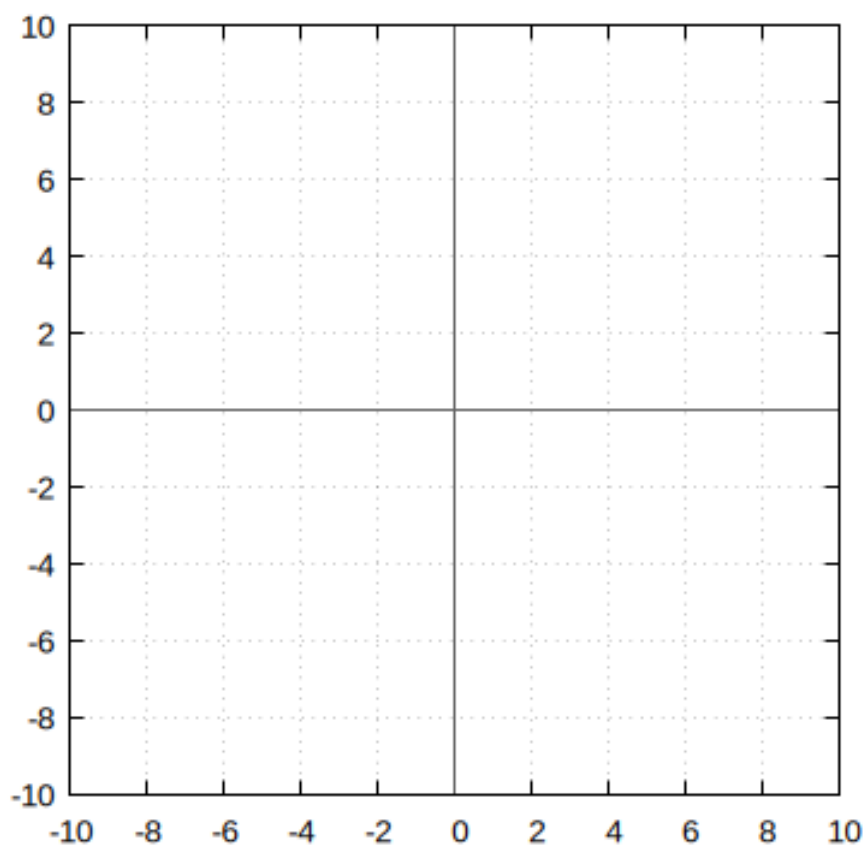
5) Let  $f(x) = x^2 + 2x - 4$  and  $g(x) = \frac{1}{x+1}$ .

a) Evaluate  $g(f(0))$

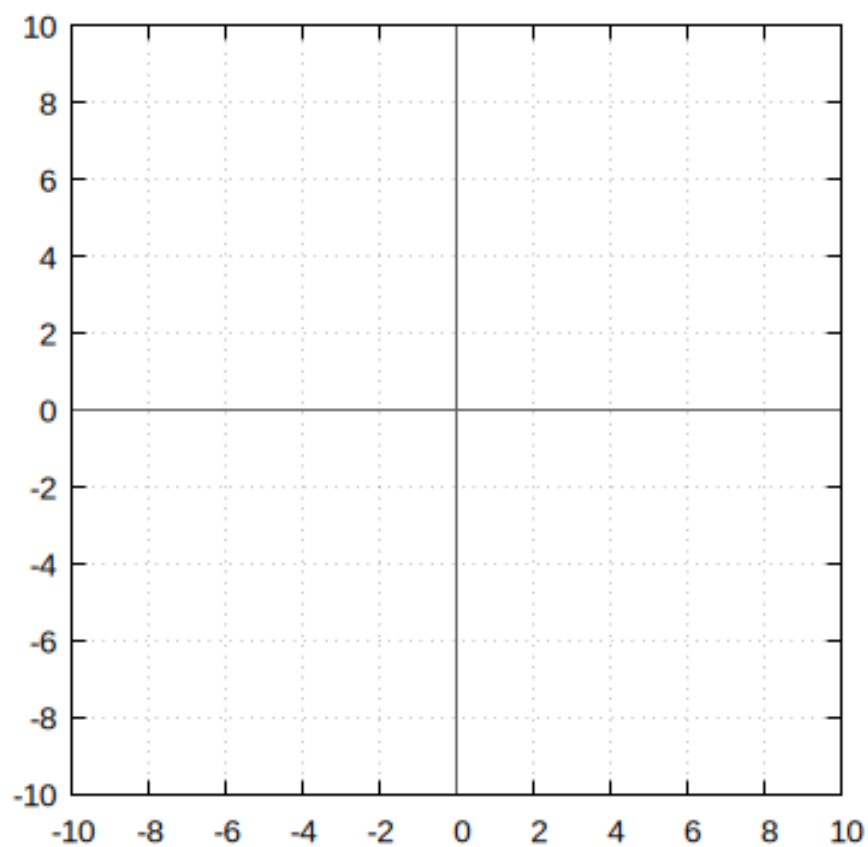
b) Evaluate  $f(g(-2))$

6) Let  $f(x) = x^2 + 3x$  and  $g(x) = 2x - 5$ . Determine an equation for each composite function and graph it.

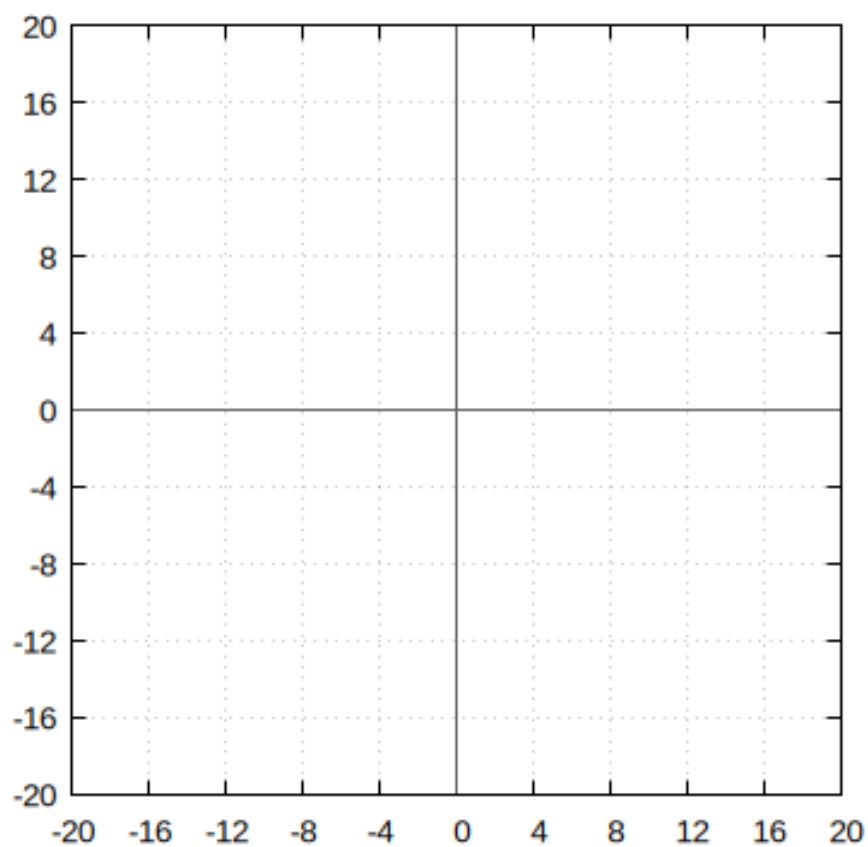
a)  $y = f(g(x))$



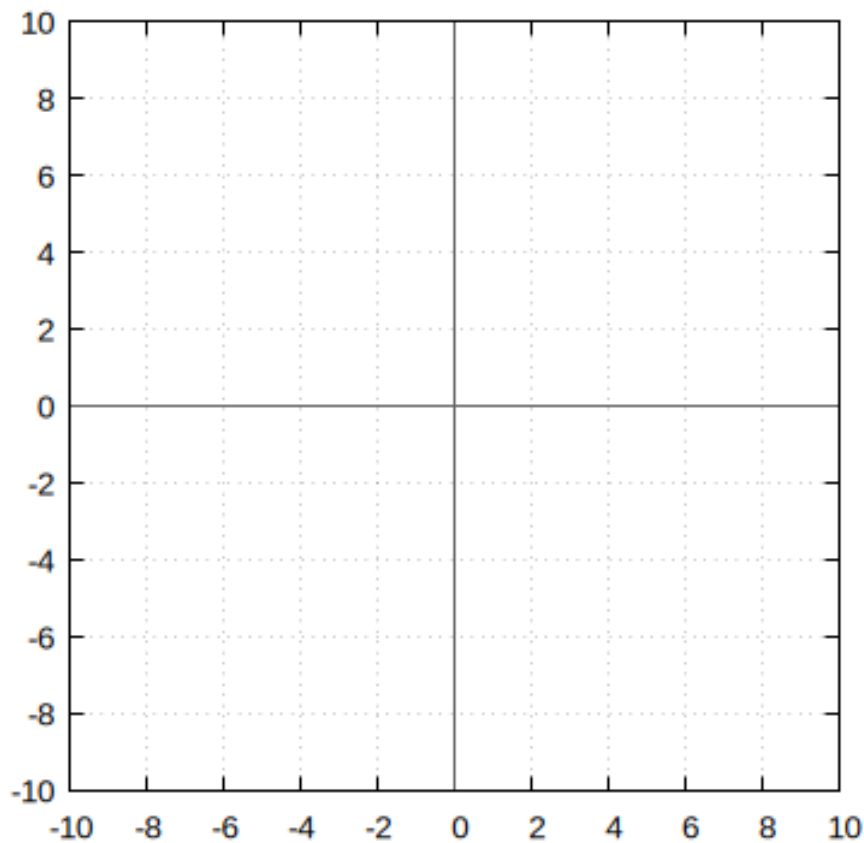
b)  $y = g(f(x))$



c)  $y = g(g(x))$



d)  $y = g^{-1}(g(x))$



## Answer Key

1) a)  $h(x) = 5x - 2$ ,  $h(2) = 8$  b)  $k(x) = x - 8$ ,  $k(2) = -6$

3)  $h(x) = x^2 + 4x - 5 = (x + 5)(x - 1)$ , vertex  $(-2, -9)$

4) a)  $y = (x - 2)^2(x + 2)$  b)  $y = \frac{1}{x + 2}$ , hole at  $x = 2$  c)  $y = x + 2$ , hole at  $x = 2$

5) a)  $-\frac{1}{3}$  b)  $-5$

6) a)  $y = 2(2x - 5)(x - 1)$ , vertex  $(1.75, -2.25)$  b)  $y = 2x^2 + 6x - 5$ , vertex  $(-1.5, -9.5)$  c)  $y = 4x - 15$  d)  $y = x$