Name _____

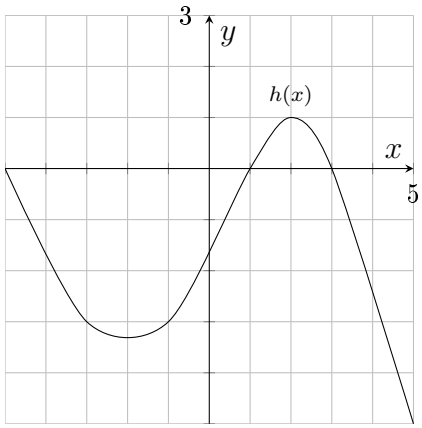
Homework 3
Combining Functions
Inverse Functions
Quadratic Functions

1. (2ea) Use the functions below to compute (and simplify) the following quantities. **Show some work!** (with correct notation)

$$f(x) = \frac{2x}{x-3}$$

$$g(x) = x^2 - 2$$

x	-2	-1	0	1	2	3
$k(x)$	-3	2	1	3	-4	5



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

(b) $(k + h)(-1) =$

(c) $(gk)(-2) =$

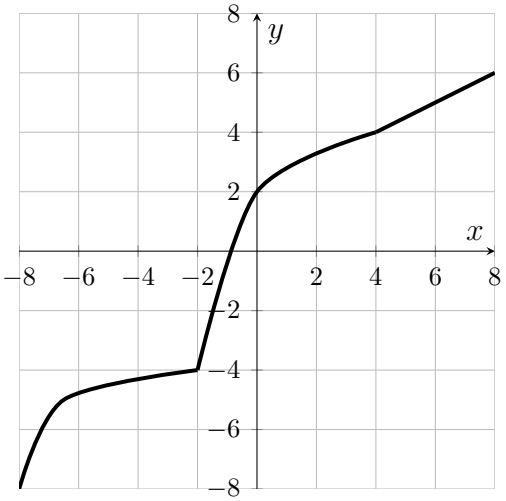
(d) $(k \circ k)(1) =$

(e) $\left(\frac{f}{g}\right)(2) =$

(f) $(h \circ h)(2) =$

(g) $g\left(f\left(k(3)\right)\right) =$

2. (5) Let $f(x)$ be the function graphed below. Sketch the graph of $f^{-1}(x)$ on the same set of axes.



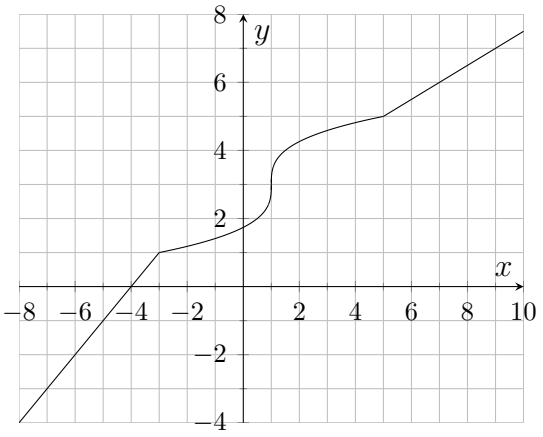
3. (6) Determine the quadratic function which has vertex $(-3, 4)$ and passes through the point $(1, 12)$. Give your answer in *general* form.

4. (5) Dennis the mad scientist determines that his profit, in hundreds of dollars, from raising and selling x emus is given by the function

$$P(x) = -0.1x^2 + 17.2x - 108.$$

What is Dennis's maximum profit from emu sales?

5. (2ea) Given the functions $g(x)$ and $h(x)$ shown below, compute each of the quantities.



This is the graph of $y = g(x)$

x	-3	-1	0	1	4	5
$h(x)$	2	5	6	0	1	-3

(a) $g^{-1}(-3) =$

(b) $h^{-1}(0) =$

(c) $h^{-1}\left(g(-3)\right) =$

(d) $g^{-1}\left(h^{-1}(6)\right) =$

(e) $g^{-1}\left(g(3)\right) =$