Written assignments to hand in.

Section 2.5
42, 50
Due Tuesday 10/24

Section 2.6
46, 50
Due Wednesday 10/25

Section 2.7
16, 56
Due Friday 10/26

Discussion Problems
From the department syllabus
These are not to hand in.

Sections 2.6, 2.7

WebAssign

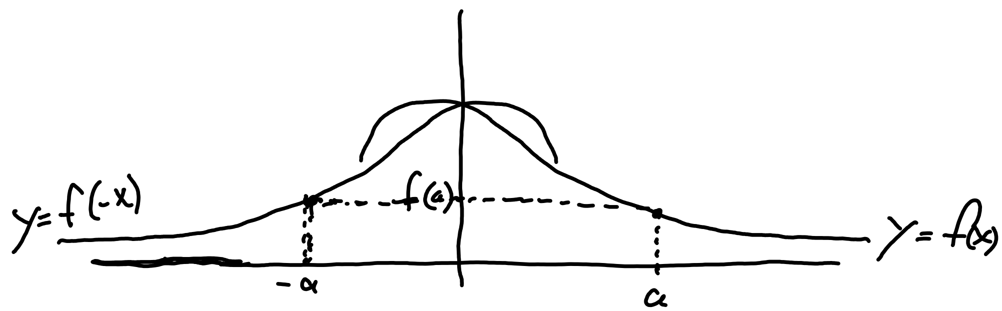
Sections 2.5 + 2.6
Due Wednesday 10/25 9pm

Exam 2 will be covering
1.6-1.8, 2.1-2.8
Tentatively scheduled
Tuesday 10/31

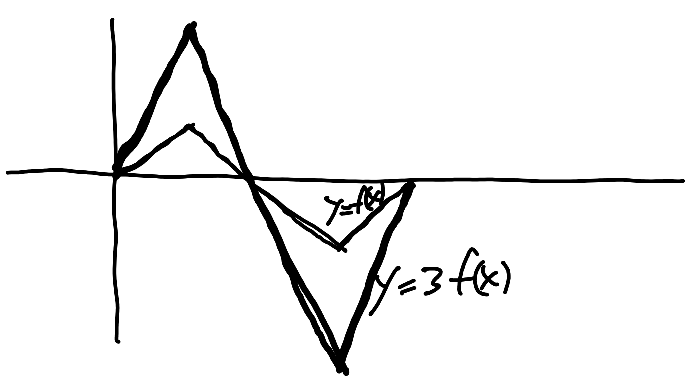
Section 2.6

9 a. Describe the graph $y=f(-x)$ in terms of $y=f(x)$.

The graph $y=f(-x)$ is obtained from $y=f(x)$ by reflection around the x-axis.



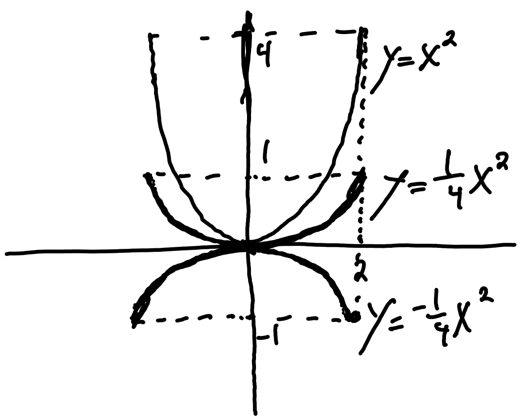
(b) $y=3f(x)$ is obtained from $y=f(x)$ by stretching vertically a factor of 3.



(12) (a) $y=f(x+3)+2$ is obtained from $y=f(x)$ by shifting up 2 units and left 3 units.

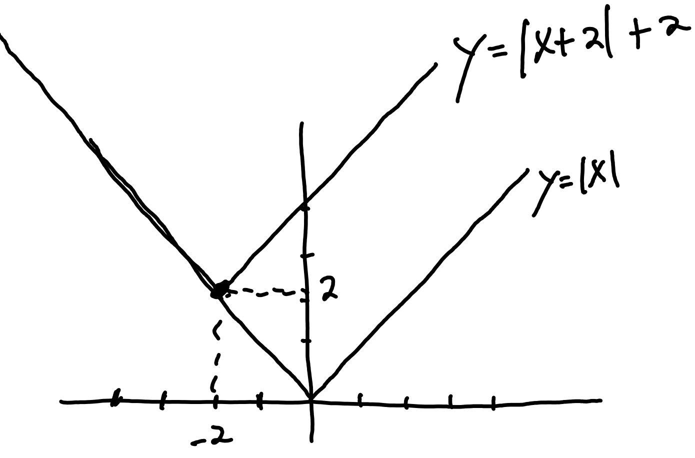
(6) $y = f(x-7) - 3$ is obtained from $y = f(x)$ by shifting down 3 units and right 3 units.

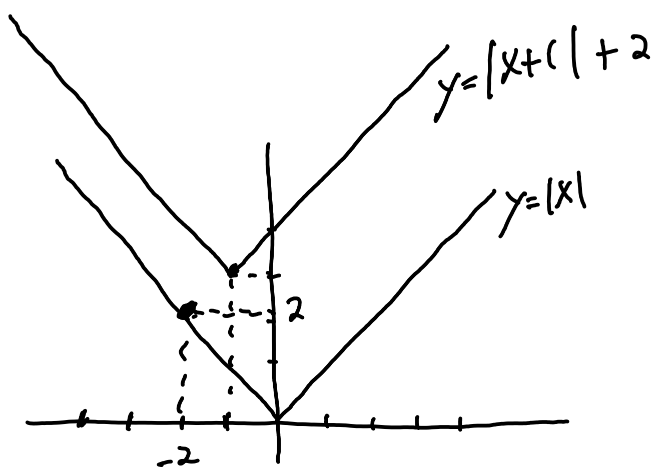
(41) $y = \frac{1}{4}x^2$ what about $y = \frac{-1}{4}x^2$?



$y = |x+2| + 2$

(49) $y = |x+2| + 2$





Section 2.7

(9) $f(x)=x^2+x$, $g(x)=x^2$ find the following functions and their domains

$(f+g)(x) = f(x)+g(x) = x^2+x+x^2 = \boxed{2x^2+2}$ Domain $= (-\infty,\infty)$

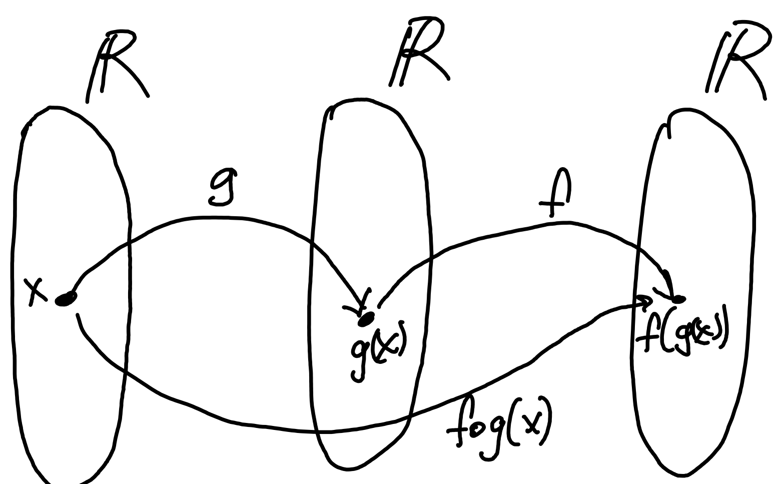
$(f-g)(x) = f(x)-g(x) = x^2+x-x^2 = \boxed{x}$ Domain $= (-\infty,\infty)$

$(fg)(x) = f(x)\,g(x) = (x^2+x)x^2 = \boxed{x^4+x^3}$ Domain $= (-\infty,\infty)$

$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)} = \boxed{\frac{x^2+x}{x}} = \frac{x^2}{x}+\frac{x}{x} = \boxed{x+1}$ Domain = all real $x \neq 0$.

if $x \neq 0$

(27)



By definition $(f\circ g)(x) = f(g(x))$

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

(a) $(f\circ g)(0) = f(g(0)) = f(4) = 5$

(b) $(g\circ f)(0) = g(f(0)) = g(-3) = -5$

(c) $(f\circ f)(0) = f(f(0)) = f(-3) = -9$

(d) $(g\circ g)(0) = g(g(0)) = g(4) = -12$

(51) $f(x) = \frac{1}{x}$ $g(x) = 2x+4$ find $f\circ g$, $g\circ f$, $f\circ f$, $g\circ g$ and state their domains.

$(f\circ g)(x) = f(g(x)) = f(2x+4) = \boxed{\frac{1}{2x+4}}$ domain all real $x \neq -2$

$(g\circ f)(x) = g(f(x)) = g\left(\frac{1}{x}\right) = 2\frac{1}{x}+4 = \boxed{\frac{2+4x}{x}}$ domain is all real $x \neq 0$.

$(f\circ f)(x) = f(f(x)) = f\left(\frac{1}{x}\right) = \boxed{\frac{1}{\frac{1}{x}} = x}$ domain is all real $x \neq 0$.

$(g\circ g)(x) = g(g(x)) = g(2x+4) = 2(2x+4)+4 = \boxed{4x+12}$ domain is all real numbers.

(55) $f(x) = \frac{x}{x+1}$ $g(x) = 2x-1$ find $f \circ g$, $g \circ f$, $f \circ f$, $g \circ g$

$$(f \circ g)(x) = f(g(x)) = f(2x-1) = \frac{2x-1}{(2x-1)+1} = \boxed{\frac{2x-1}{2x}}$$

$$(g \circ f)(x) = g(f(x)) = g\left(\frac{x}{x+1}\right) = \boxed{2\left(\frac{x}{x+1}\right)-1} = \frac{2x-x-1}{x+1} = \boxed{\frac{x-1}{x+1}}$$

Here's an interesting set of 6 functions.

$$x\ ,\ 1-x,\ \frac{1}{x},\ \frac{1}{1-x},\ \frac{x}{x-1},\ \frac{x-1}{x}$$

If we let $f(x)$ and $g(x)$ be any two (or equal) functions in this list, then $(f \circ g)(x)$ will also be in the list.