1.2:
- #15-29odd (determining if a relation is a function; determining function values)
- #40,41,42,45,48 (determining domain of a function)
- #59-70all (determining if a graph is a function; domain & range from graph)

1.4:
- #35-47odd; 53-63odd (determining equations of lines; parallel v. perpendicular)

1.5:
- #1-16all (determining characteristics of functions from graphs)
- #47-61odd (determining function values of & graphing piecewise functions)
- #69-74all (finding domain, range & equation given graph of a piecewise function)

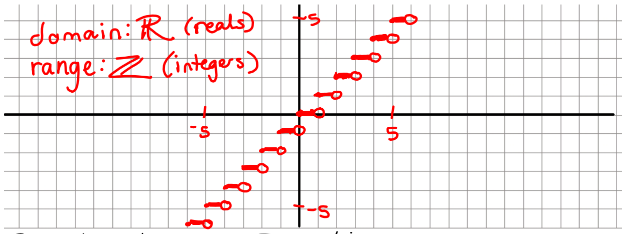
1.6: #23,29,31; 45, 49, 51; 63, 71,75; 81, 83 (algebra of functions)

1.7: #9,11,21,23; 39-47odd (symmetry tests)

#59-69odd; 77-83 odd; 93-101odd; 115-121odd (graphing with transformations)

2.4: #1,2; 15-22all; 23-27odd (parabolas)

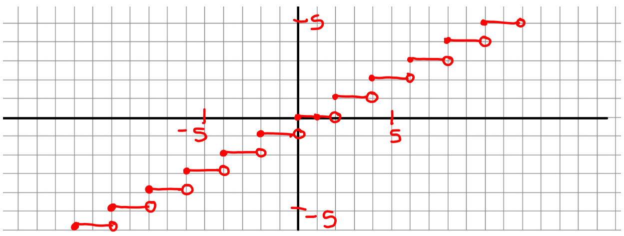
2.4: #3-13 odd



Greatest Integer Function

$[\![x]\!]$ = greatest integer less than or equal to x.

"step function" $\lfloor x \rfloor$ $y = [\![x]\!]$



$y = [\![\frac{1}{2}x]\!]$

1.6 The Algebra of Functions

Given f & g, what are $(f+g)(x)$, $(f-g)(x)$, $(fg)(x)$, $\left(\frac{f}{g}\right)(x)$, $(f \circ g)(x)$, $(g \circ f)(x)$

$(f \pm g)(x) = f(x) \pm g(x)$

$(fg)(x) = f(x) \cdot g(x)$

$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$, $g(x) \neq 0$

$(f \circ g)(x) = f(g(x))$ "f of g of x"

$(g \circ f)(x) = g(f(x))$ "f composed with g"

$f(x) = x^2 - x$; $g(x) = x + 1$

	domain:	range:
$(f+g)(x) = f(x)+g(x) = x^2 - x + x + 1 = x^2 + 1$	$\mathbb{R}$	$[1, \infty)$
$(f-g)(x) = f(x) - g(x) = x^2 - x - (x+1) = x^2 - 2x - 1$	$\mathbb{R}$	IDK (will learn)
$(fg)(x) = f(x) \cdot g(x) = (x^2 - x)(x+1) = x^3 - x$	$\mathbb{R}$	$\mathbb{R}$
$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)} = \frac{x^2 - x}{x+1}$	$\{x \mid x \neq -1\}$	IDK (will learn)
$(f \circ g)(x) = f(g(x)) = (x+1)^2 - (x+1) = x^2 + x$	$\mathbb{R}$	IDK (will learn)
$(g \circ f)(x) = g(f(x)) = x^2 - x + 1$	$\mathbb{R}$	IDK

32. $f(x) = \sqrt{x+6}$; $g(x) = \frac{1}{x}$

domain: $\{x \mid x \geq -6\}$ domain: $\{x \mid x \neq 0\}$

	domain:
$(f+g)(x) = \sqrt{x+6} + \frac{1}{x}$ $x+6 \geq 0$ $x \neq 0$ $x \geq -6$	$[-6, 0) \cup (0, \infty)$
$(fg)(x) = \frac{\sqrt{x+6}}{1} \cdot \frac{1}{x} = \frac{\sqrt{x+6}}{x}$ $x \geq -6$ $x \neq 0$	$[-6, 0) \cup (0, \infty)$
$\left(\frac{f}{g}\right)(x) = \frac{\sqrt{x+6}}{\frac{1}{x}} = \sqrt{x+6} \cdot \frac{x}{1} = x\sqrt{x+6}$ $\frac{1}{x}$ ← still have to exclude 0	$[-6, 0) \cup (0, \infty)$

$f+g$, $f-g$, fg, $\frac{f}{g}$* have domains = intersection of domain of f & domain of g

*f/g also excludes values of x that make $g(x) = 0$

$f(x) = x+2$; $g(x) = x$; $\left(\frac{f}{g}\right)(x) = \frac{x+2}{x}$ domain: $\{x \mid x \neq 0\}$

$f(x) = \sqrt{x+6}$; $g(x) = \frac{1}{x}$

$(f \circ g)(x) = \sqrt{\frac{1}{x} + 6}$ domain: $\{x \mid \frac{1}{x} + 6 \geq 0\}$

$= \{x \mid \frac{1+6x}{x} \geq 0\}$ ← solution to this rational inequality

$(g \circ f)(x) = \frac{1}{\sqrt{x+6}}$ domain: $\{x \mid x > -6\}$

$x + 6 > 0$

84. $h(x) = |9x^2-4|$

find functions f & g such that $h(x) = (f \circ g)(x)$.

$f(x)$	$g(x)$	
$\lvert 9x^2-4\rvert$	x	trivial cases
x	$\lvert 9x^2-4\rvert$	
$\lvert 9x-4\rvert$	x^2	
$\lvert x^2-4\rvert$	$3x$	
$\lvert 3x-4\rvert$	$3x^2$	

$f(x)$	$g(x)$
$\lvert x-4\rvert$	$9x^2$
$\lvert x\rvert$	$9x^2-4$