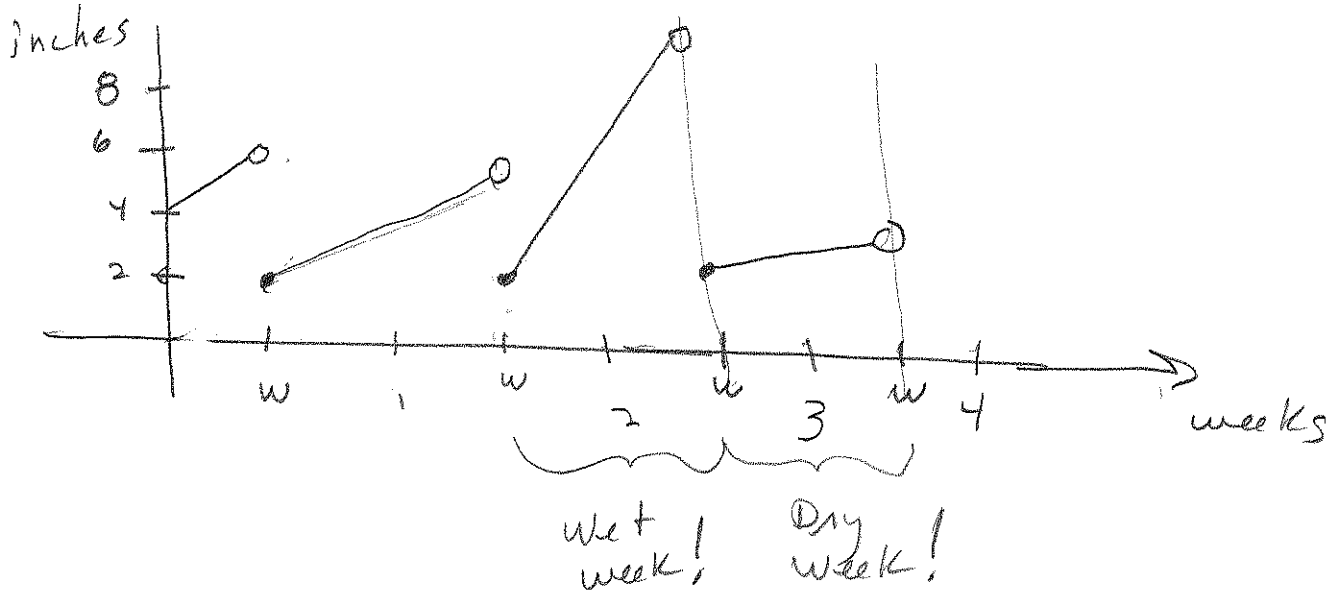
201 §1.1 #s 21, 25, 43, 47-59, 63, 73, 77 ODDS.

(21) A homeowner mows the lawn once a week, on Wed. Sketch a graph of the grass-height function over 4 weeks.



(25) $f(x) = 3x^2 - x + 2 \longrightarrow$

$f(2) = 3(2)^2 - 2 + 2 = \boxed{12 = f(2)}$

$f(-2) = 3(-2)^2 - (-2) + 2 = 12 + 4 = \boxed{16 = f(-2)}$

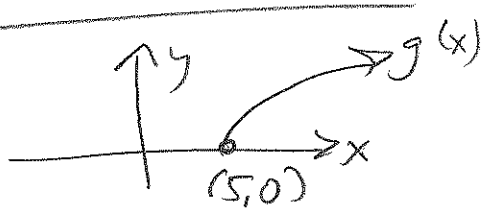
$\boxed{f(a) = 3a^2 - a + 2}$

$f(-a) = 3(-a)^2 - (-a) + 2 = 3a^2 + a + 2 = f(-a)$

$f(a+1) = 3(a+1)^2 - (a+1) + 2 = 3(a^2+2a+1) - a - 1 + 2$

$= 3a^2 + 6a + 3 - a + 1 = \boxed{3a^2 + 5a + 4 = f(a+1)}$

#s 39-50 Find $\mathcal{D}$ & sketch



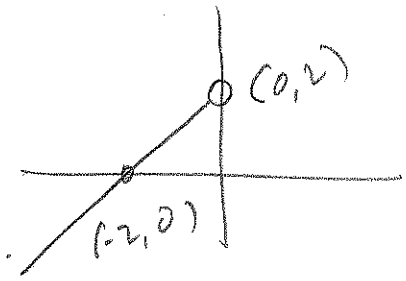
(43) $g(x) = \sqrt{x-5} \Longrightarrow \mathcal{D}(g) = \{x \mid x - 5 \geq 0\}$

$= \boxed{\{x \mid x \geq 5\} = [5, \infty) = \mathcal{D}(g)}$

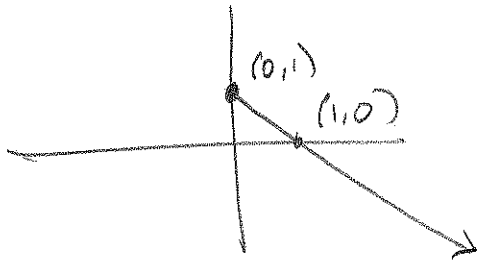
201 §1.1 #s 47-59, 63, 73, 77

(47) $f(x) = \begin{cases} x+2 & \text{if } x < 0 \\ 1-x & \text{if } x \geq 0 \end{cases}$

$\mathcal{D}(f) = \mathbb{R}$

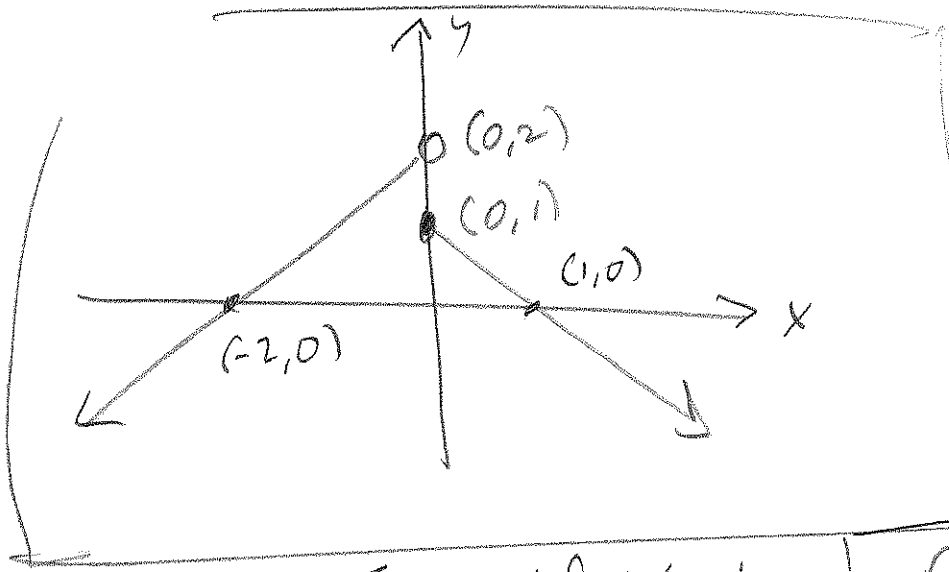


$x+2, \; x<0$



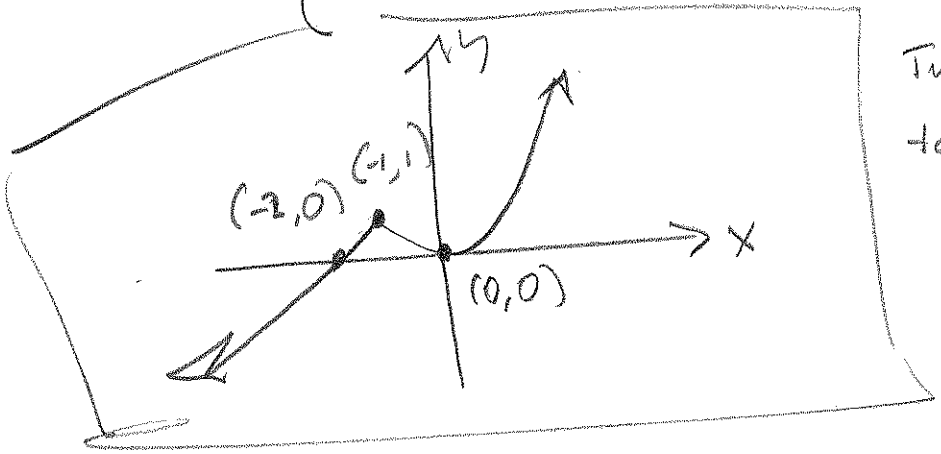
$1-x, \; x \geq 0$

combine:



(49) $f(x) = \begin{cases} x+2 & \text{if } x \leq -1 \\ x^2 & \text{if } x > -1 \end{cases}$

$\mathcal{D} = \mathbb{R}$



Two pieces actually touch.

201 § 1.1 #s 51, 59, 63, 73, 77

#s 51-56 Find an expression for the function whose graph is the given curve.

(51) Line SEGMENT from $(1,-3)$ to $(5,7)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7-(-3)}{5-1} = \frac{10}{4} = \frac{5}{2} = m$$

$$y = m(x - x_1) + y_1$$

$$y = \frac{5}{2}(x-1) - 3 \quad \text{or} \quad y = \frac{5}{2}(x-5) + 7$$

Need $1 \le x \le 5$ in your answer

(53) The bottom ½ of the parabola

$$x + (y-1)^2 = 0 \longrightarrow$$

$$(y-1)^2 = -x \longrightarrow$$

$$y - 1 = \pm\sqrt{-x} \longrightarrow$$

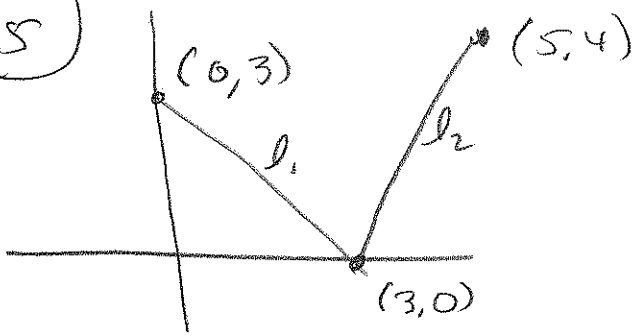
$$y = 1 \pm \sqrt{-x} \longrightarrow$$

$$y = \pm\sqrt{-x} + 1 \longrightarrow$$

$y = -\sqrt{-x} + 1$ is bottom half.

201 §1.1 #s 55, 57, 59, 63, 73, 77

(55)



l_1: $m = \frac{0-3}{3-0} = \frac{y_2-y_1}{x_2-x_1}$

$= \frac{-3}{3} = -1 \Rightarrow$

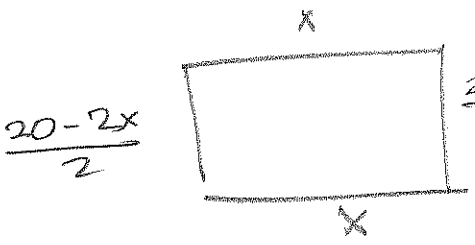
l_1: $y = -1(x-0)+3$

l_2: $m = \frac{y_2-y_1}{x_2-x_1} = \frac{4-0}{5-3} = \frac{4}{2} = 2 \Rightarrow$

l_2: $y = 2(x-3)+0$

#s 57-61 Find a formula for function described & state its domain.

(57) Rect. w/ Perimeter = P = 20 m, Express its area as func. of one of its sides

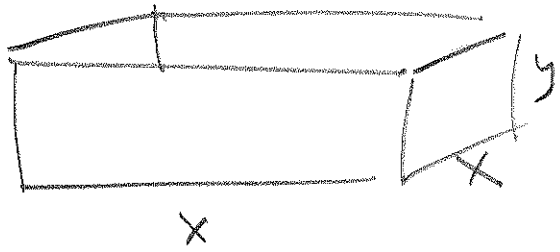


$A(x) = x(10-x)$

$D = (0, 10)$

201 §1.1 #s 59, 63, 73, 77

(61) An open rect. box with vol $2\ m^3$ has a square base. Express the surface area as func. of length of a side. open top.



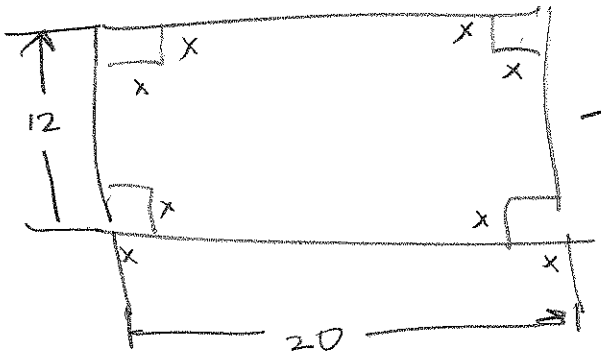
$x^2 y = 2 \Rightarrow y = \frac{2}{x^2}$

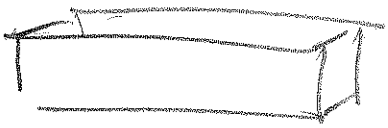
Volume.

Area: $x^2 + 4xy = x^2 + 4x\left(\frac{2}{x^2}\right) \Rightarrow$

$$A(x) = x^2 + \frac{8}{x}$$

(63) Box w/ open top from piece of cardboard 12 in x 20 in. Cut out equal squares, x inches from 4 corners & fold.





Express volume as $V(x)$

$$V = x^2(20-2x)(12-2x)$$

201 §1.1 #s 73, 77

#s 73-78 Determine whether f is even, odd or neither.

(73) $f(x) = \frac{x}{x^2+1}$ is odd, b/c

$$f(-x) = \frac{-x}{(-x)^2+1} = -\frac{x}{x^2+1} = -f(x)$$ ✓

(77) $f(x) = 1 + 3x^2 - x^4$ is even, b/c

$$f(-x) = 1 + 3(-x)^2 - (-x)^4 = 1 + 3x^2 - x^4 = f(x)$$ ✓