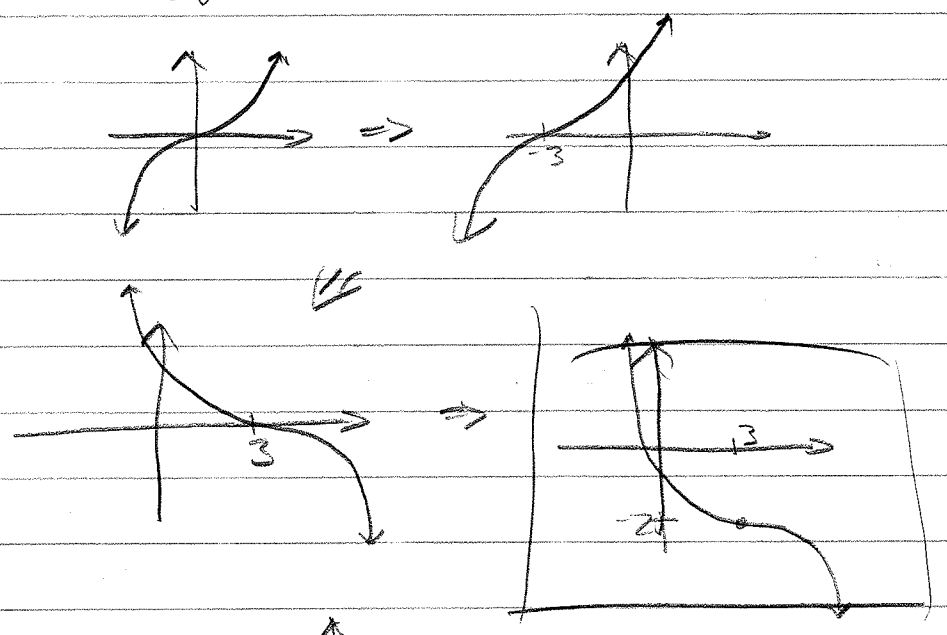


Exam Review #2

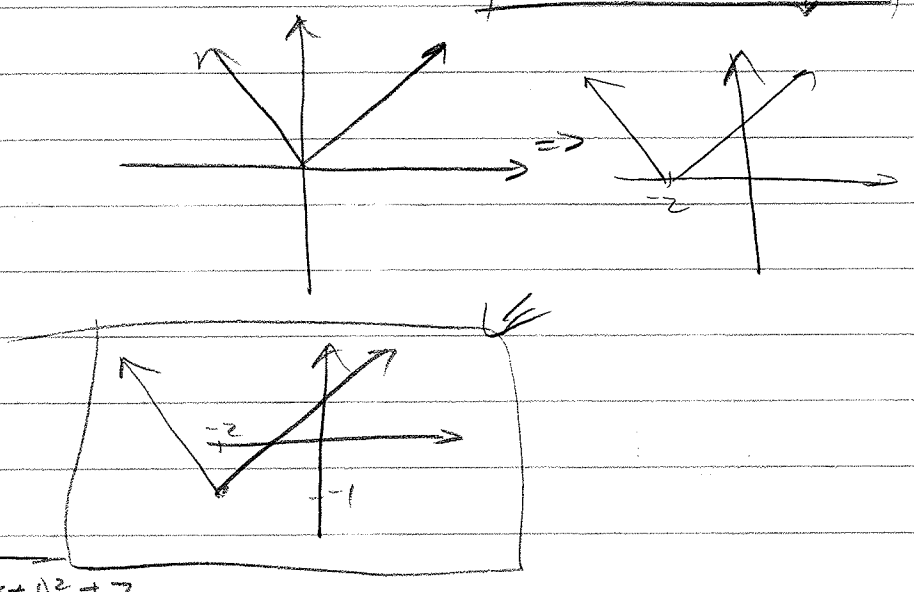
1a $(3-x)^3 - 2 = (-x+3)^3 - 2$

underlying graph: x^3
 shift L by 3
 reflect on y-axis
 shift down 2



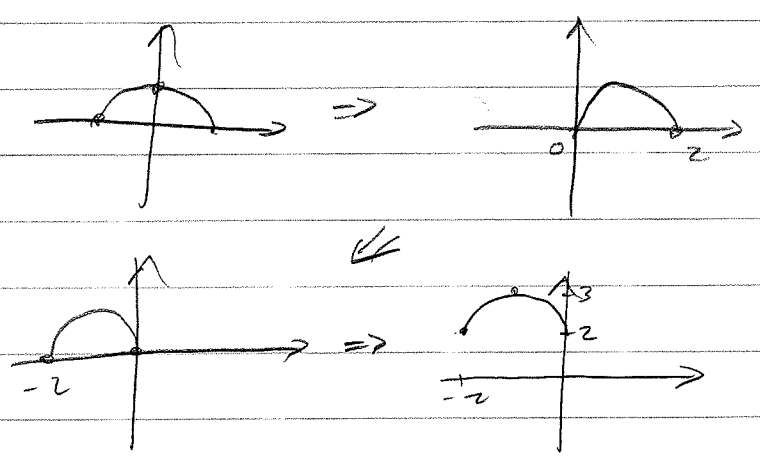
1b $|x+2| - 1$

underlying graph: $|x|$
 shift L by 2
 shift down by 1



1c $\sqrt{1-(1-x)^2} + 2 = \sqrt{1-(-x+1)^2} + 2$

underlying graph: $\sqrt{1-x^2}$
 shift R by 1
 reflect on y-axis
 shift up by 2



2 | There is initially 20(0.20) salt in the water. Thus we need

$$20(0.20) = x(0.06)$$

$$4 = x(0.06)$$

$$x = \frac{4}{0.06} = \boxed{\frac{200}{3}}$$

3

$$a) \frac{x^2 - 4}{x^2 + 4} \geq 0$$

$$\hookrightarrow \frac{(x-2)(x+2)}{x^2+4} \geq 0$$

$x^2 + 4$ is never 0



test: 0 $\frac{(-)(+)}{(+)}$ = -

answer: $(-\infty, -2] \cup [2, \infty)$

$$b) \frac{x^2 - 4}{x^2 - 1} \geq 0$$

$$\Rightarrow \frac{(x-2)(x+2)}{(x-1)(x+1)} \geq 0$$



test: 0 $\frac{(-)(+)}{(-)(+)}$ = +

$(-\infty, -2] \cup [-1, 1] \cup [2, \infty)$

$$c) \frac{x^2 - 4}{(x-1)^2} \geq 0$$

$$\frac{(x-2)(x+2)}{(x-1)^2} \geq 0$$



test: 0 $\frac{(-)(+)}{(+)}$ = -

$(-\infty, -2] \cup [2, \infty)$

4) using vertex form, we have

$$f(x) = a(x+2)^2 + 2$$

if it passes thru (0,0), put $x=0$ $f(x)=0$

$$0 = a(0+2)^2 + 2$$

$$0 = 4a + 2$$

$$-2 = 4a$$

$$a = -\frac{1}{2}$$

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

$$5. a) 4x - 3 \leq 0$$

$$\Rightarrow 4x \leq 3$$

$$x \leq 3/4$$

$$(-\infty, 3/4]$$

$$b) |4x - 3| \leq 0$$

absolute value is always ≥ 0

so this only applies when it equals 0!

$$4x - 3 = 0$$

$$4x = 3$$

$$x = 3/4$$

$$\Rightarrow \{3/4\}$$

$$c) |4x - 3| > 0$$

from above, this is

$$(-\infty, 3/4) \cup (3/4, \infty)$$

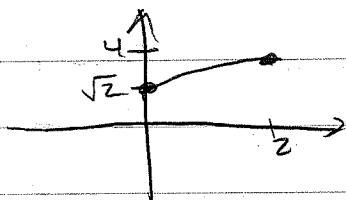
6) a) the domain is $[0, 2]$, since it is in the definition of the function. All numbers in this range work

b) this is easier to see from the graph (see pt d)

the range is $[\sqrt{2}, 2]$

$$c) \text{ARC} = \frac{2 - \sqrt{2}}{2 - 0} = \frac{2 - \sqrt{2}}{2}$$

d)



$$7. h(z) = \frac{z-1}{z+1} + 2$$

$$y = \frac{z-1}{z+1} + 2$$

$$z = \frac{y-1}{y+1} + 2$$

$$z-2 = \frac{y-1}{y+1}$$

$$(z-2)(y+1) = y-1$$

$$zy - 2y + z - 2 = y - 1$$

$$z - 2 + 1 = y + 2y - zy$$

$$z - 1 = y(3 - z)$$

$$y = \frac{z-1}{3-z}$$

$$h^{-1}(z) = \frac{z-1}{3-z}$$

Domain of h : $(-\infty, -1) \cup (-1, \infty)$ = Range of h^{-1}

Domain of h^{-1} : $(-\infty, 3) \cup (3, \infty)$ = Range of h

$$8. a) fg(x) = f(x)g(x) = \frac{\sqrt{x-3}}{x^2-7}$$

$$b) fog(x) = f(g(x)) = \frac{1}{(\sqrt{x-3})^2-7} = \frac{1}{x-3-7} = \frac{1}{x-10}$$

c) domain of g is $x \geq 3 \Rightarrow [3, \infty)$

domain of $\frac{1}{x-10}$ is $(-\infty, 10) \cup (10, \infty)$

combine these to get $[3, 10) \cup (10, \infty)$

$$9. f(x) = 2x^2 + 8x - 1$$

$$= 2(x^2 + 4x - 1/2) = 2(x^2 + 4x + 4 - 4 - 1/2)$$

$$B = -\frac{4}{2} = -2 = 2(x^2 + 4x + 4) - 9/2$$

$$B^2 = 4$$

$$= 2(x+2)^2 - 9$$

y -int: -1

