

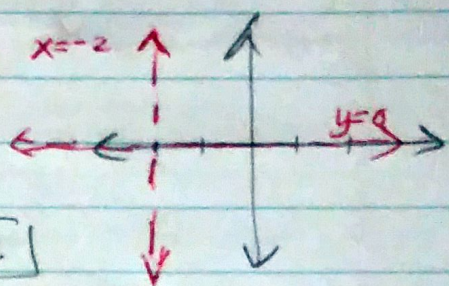
HW 2C.2 p 148-151
 # 7-20, 23, 31-33, 35

SOLUTIONS

7) $f(x) = \frac{2}{x+2}$

HA) $n=0, m=1$
 $n < m \Rightarrow y=0$

VA) $x+2=0$
 $x=-2$

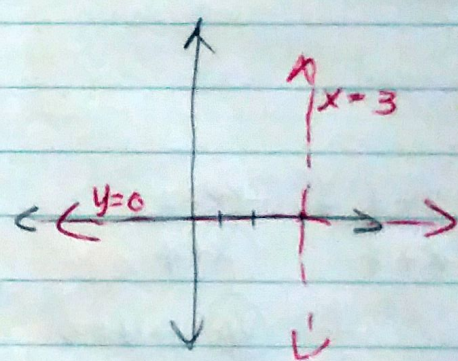


A

8) $f(x) = \frac{1}{x-3}$

HA) $n=0, m=1$
 $n < m$
 HA $\Rightarrow y=0$

VA) $x-3=0$
 $x=3$

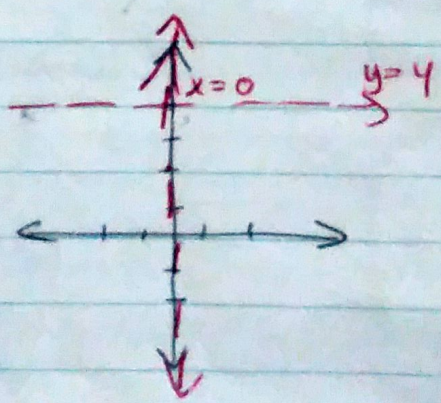


D

9) $f(x) = \frac{4x+1}{x}$

HA) $n=1, m=1$
 $n=m \Rightarrow y = \frac{4}{1}$

VA) $x=0$

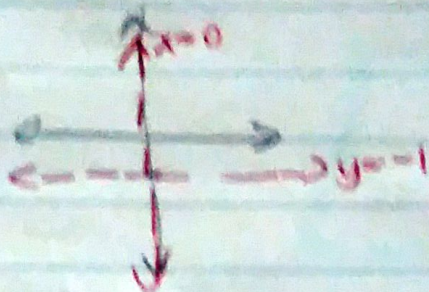


C

(10) $f(x) = \frac{1-x}{x}$

(HA) $n=1, m=1$ (VA) $x=0$

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



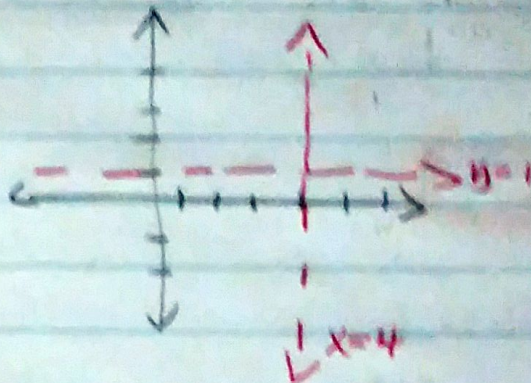
E

(11) $f(x) = \frac{x-2}{x-4}$

(HA) $n=1, m=1$ (VA) $x-4=0$

$n=m \rightarrow y = \frac{1}{1}$

$x=4$



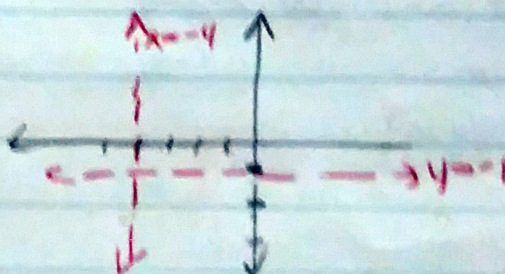
B

(12) $f(x) = -\frac{x+2}{x+4} = \frac{-(x+2)}{x+4}$

(HA) $n=1, m=1$ (VA) $x+4=0$

$n=m \rightarrow y = \frac{-1}{1}$

$x=-4$



F

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

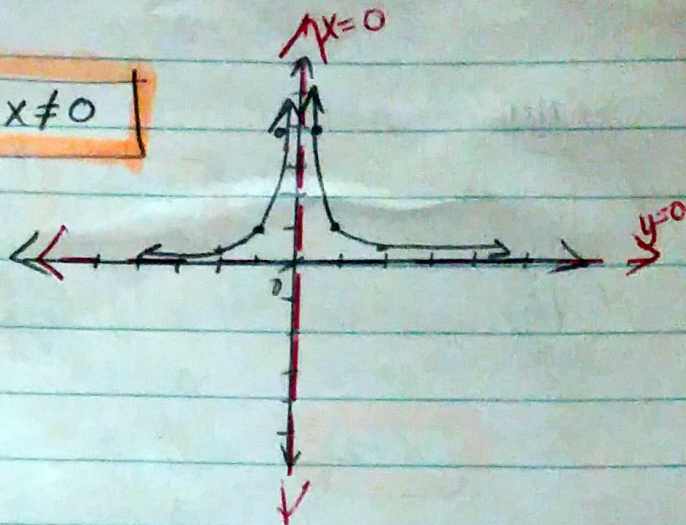
Domain: all $x, x \neq 0$

HA) $n=0, m=2$

$n < m \Rightarrow y=0$

VA) $x^2=0$

$x=0$



x	$y = \frac{1}{x^2}$
0	NA
1	1
2	$\frac{1}{4}$
-1	1
-2	$\frac{1}{4}$
$\frac{1}{2}$	4
$-\frac{1}{2}$	4

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

Domain: all $x, x \neq 2$

HA) $n=1, m=3$

$n < m$ HA $\Rightarrow y=0$

$(x-2)^3 = 0$

$x-2=0$

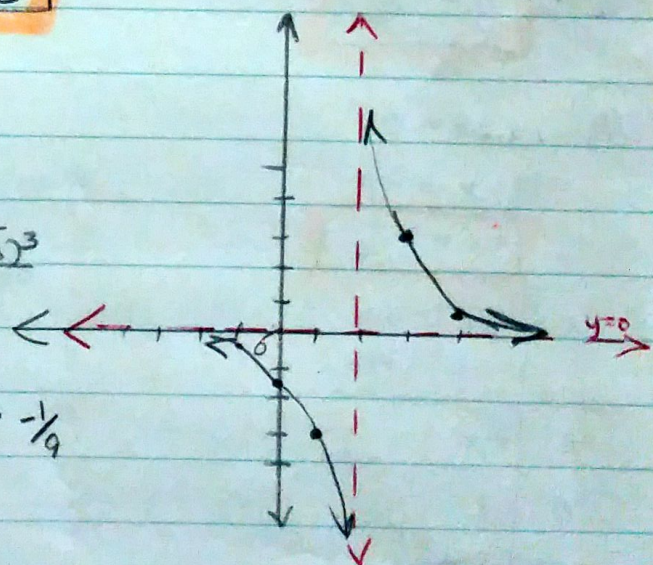
$x=2$

VA) $(x-2)^3 = 0$

$x-2=0$

$x=2$

x	$y = \frac{3}{(x-2)^3}$
0	$-\frac{3}{8}$
1	-3
-1	$-\frac{3}{2^3} = -\frac{1}{4}$
3	3
4	$\frac{3}{8}$



$$(15) f(x) = \frac{2+x}{2-x} = \frac{x+2}{-x+2}$$

$$2-x=0$$

$$-x=-2$$

$$x=2$$

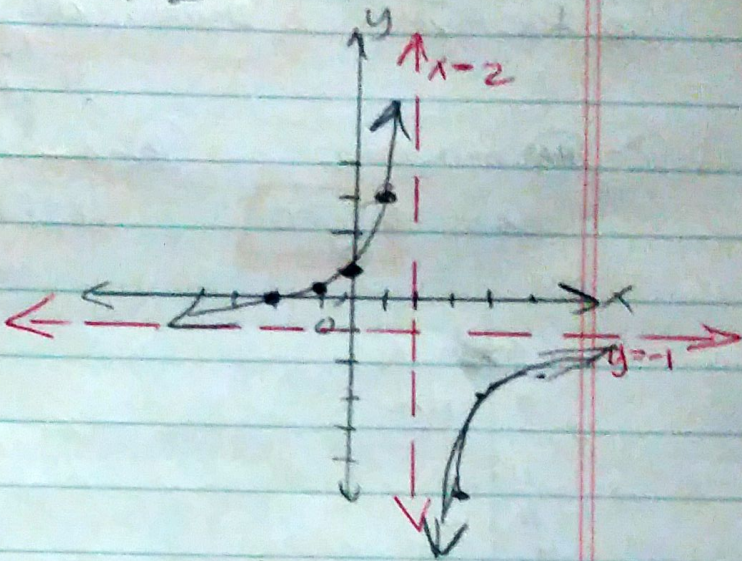
DOMAIN: all x , $x \neq 2$

HA) $n=1, m=1$

$n=m$ so HA $\Rightarrow y = \frac{1}{-1}$

VA) $2-x=0$
 $-x=-2$
 $x=2$

x	$y = \frac{2+x}{2-x}$
0	1
1	3
3	$\frac{5}{-1} = -5$
4	$\frac{6}{-2} = -3$
5	$\frac{7}{-3}$
-1	$\frac{1}{3}$
-2	0



$$(16) f(x) = \frac{1-5x}{1+2x}$$

$$1+2x=0$$

$$2x=-1$$

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

DOMAIN: all x , $x \neq -\frac{1}{2}$

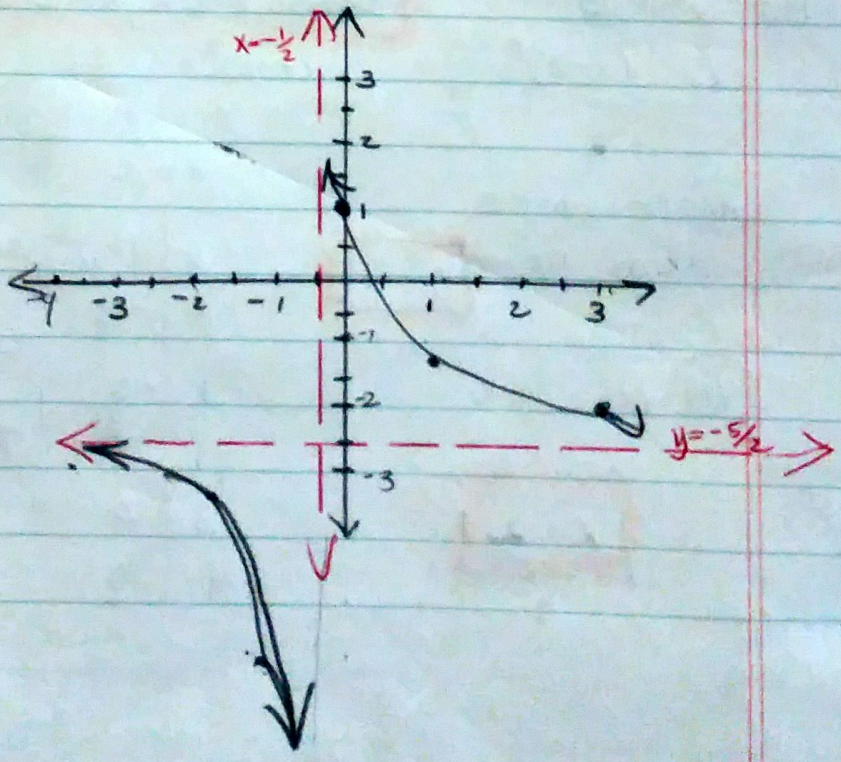
HA) $n=1, m=1$

$\Rightarrow y = -\frac{5}{2}$

VA) $1+2x=0$

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

x	$y = \frac{1-5x}{1+2x}$
-1	-6
0	1
-4	-3
3	2
1	$-1, \bar{3}$
-2	-3,67



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

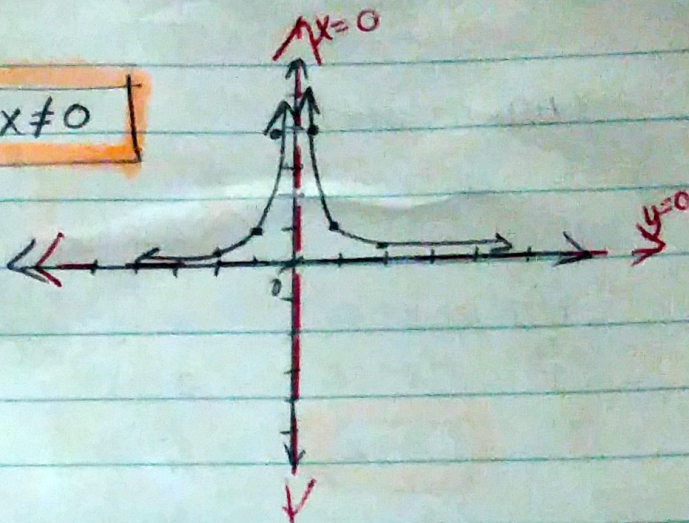
Domain: all $x, x \neq 0$

HA) $n=0, m=2$

$n < m \Rightarrow y=0$

VA) $x^2=0$

$x=0$



x	$y = \frac{1}{x^2}$
0	NA
1	1
2	1/4
-1	1
-2	1/4
1/2	4
-1/2	4

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

Domain: all $x, x \neq 2$

$(x-2)^3 = 0$

$x-2=0$

$x=2$

HA) $n=1, m=3$

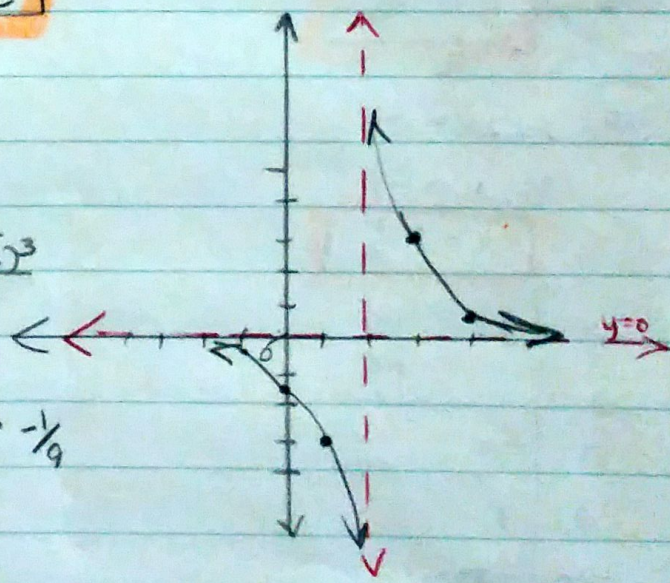
$n < m$ HA $\Rightarrow y=0$

VA) $(x-2)^3 = 0$

$x-2=0$

$x=2$

x	$y = \frac{3}{(x-2)^3}$
0	-3/8
1	-3
-1	-3/27 = -1/9
3	3
4	3/8



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

$2x^2 - x = 0$

$x(2x - 1) = 0$

$x = 0 \quad 2x - 1 = 0$

$2x = 1$

$x = \frac{1}{2}$

DOMAIN: all $x, x \neq 0, \frac{1}{2}$

HA) $n=2, m=2$

HA $y = \frac{1}{2}$

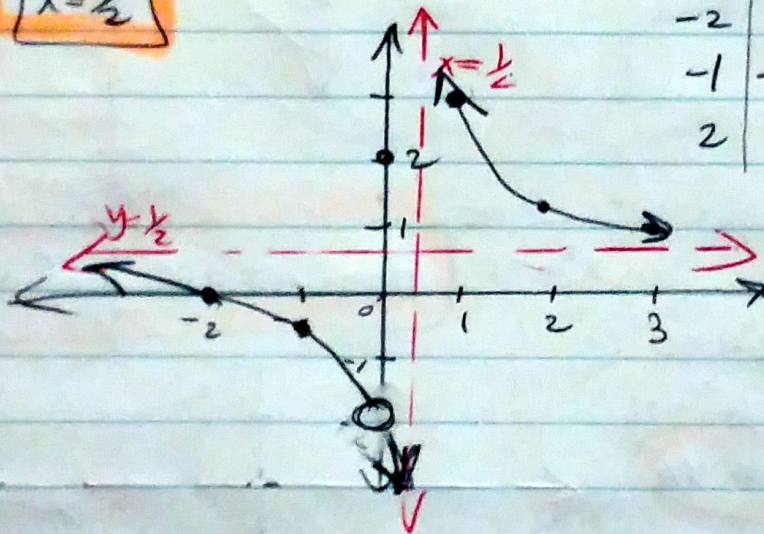
VA) $\frac{x(x+2)}{x(2x-1)}$

$2x - 1 = 0$ (Hole @ $x=0$)

$2x = 1$

$x = \frac{1}{2}$

x	$y = \frac{x^2 + 2x}{2x^2 - x}$
0	2 (Hole)
1	3
3	1
-2	0
-1	-0.33
2	1.33



18) $f(x) = \frac{x^2 - 25}{x^2 + 5x} = \frac{(x+5)(x-5)}{x(x+5)}$

$x=0$ $x+5=0$
 $x=-5$

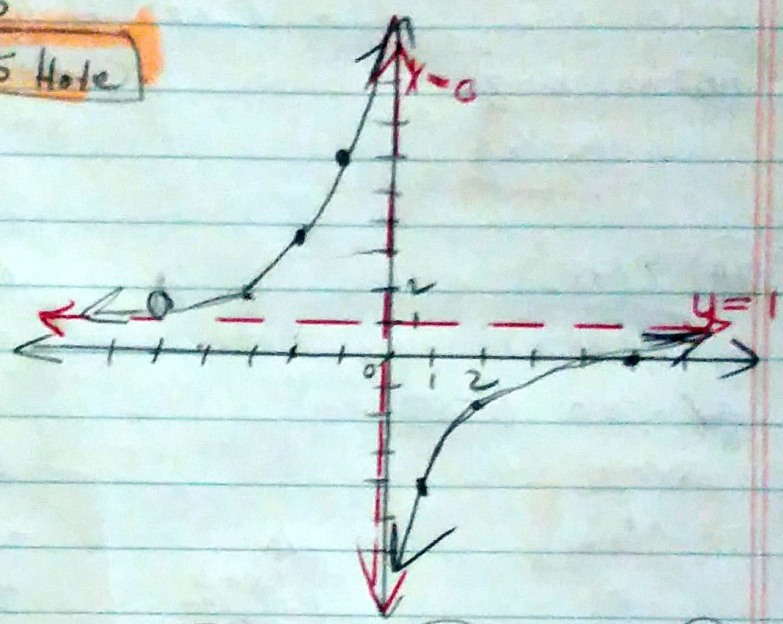
Domain: all x , $x \neq 0, -5$

HA) $n=2, m=2$
 $y=1$

VA) $x=0$

$x+5=0$
 $x=-5$ Hole

x	$y = \frac{x^2 - 25}{x^2 + 5x}$
1	-4
-1	6
2	-1.5
-2	3.5
5	0
-5	HOLE



19) $f(x) = \frac{3x^2 + x - 5}{x^2 + 1}$

$x^2 + 1 = 0$
 $x^2 = -1$

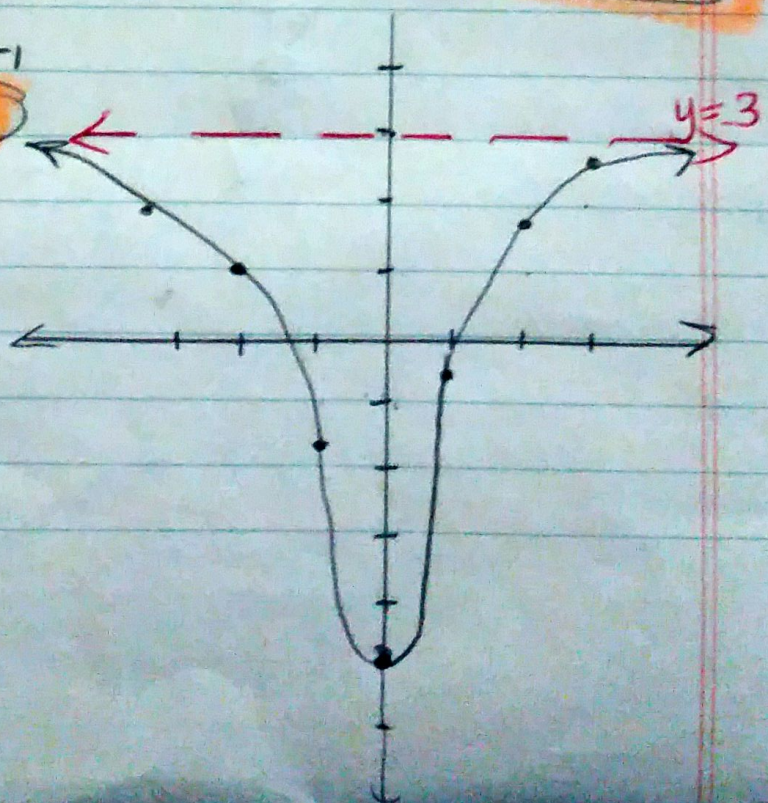
Domain = all real x

HA) $n=2, m=2$
 $y = \frac{3}{1}$

VA) $x^2 + 1 = 0$
 $x^2 = -1$

NO VA

x	$y = \frac{3x^2 + x - 5}{x^2 + 1}$
0	-5
1	-1.5
-1	-1.5
2	1.9
-2	1
3	2.5
-3	1.9



20. $f(x) = \frac{3x^2 + 1}{x^2 + x + 9}$

$x^2 + x + 9 = 0$

$x = \frac{-1 \pm \sqrt{1 - 4(1)(9)}}{2(1)}$ No Real zeros

HA: $n=2, m=2$

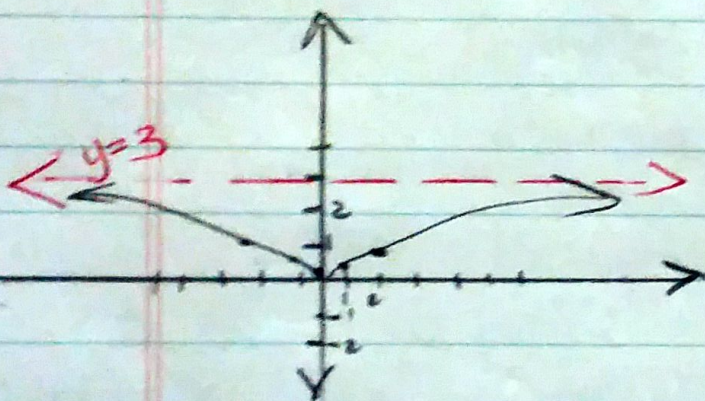
$y=3$

VA: $x^2 + x + 9 = 0$

NONE

Domain: all real x

x	$y = \frac{3x^2 + 1}{x^2 + x + 9}$
0	0.111
1	0.36
-1	0.44
2	0.87
-2	1.18



23. $f(x) = \frac{x^2 - 4}{x + 2}$

$g(x) = x - 2$

x	-4	-3	-2.5	-2	-1.5	-1	0
$f(x)$	-6	-5	-4.5	ERROR	-3.5	-3	-2
$g(x)$	-6	-5	-4.5	-4	-3.5	-3	-2

Domain of f

$x + 2 = 0$

$x = -2$

all $x, x \neq -2$

Domain of g

all real x

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

a hole at $x = -2$

NO VA

They are the same but $f(x)$ has a hole at $x = -2$

$$(31.) g(x) = \frac{x^2 - 4}{x + 3}$$

$$0 = \frac{x^2 - 4}{x + 3} \quad (\text{zeros are just where numerator} = 0)$$

$$0 = x^2 - 4$$

$$4 = x^2$$

$$\pm 2 = x$$

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

$$(32.) g(x) = \frac{x^3 - 8}{x^2 + 4}$$

$$0 = \frac{x^3 - 8}{x^2 + 4}$$

$$x^3 - 8 = 0$$

$$x^3 = 8$$

$$x = 2$$

$$(33.) f(x) = 1 - \frac{2}{x-5}$$

$$0 = 1 - \frac{2}{x-5}$$

$$(x-5) - 1 = -\frac{2}{x-5}$$

$$-x + 5 = -2$$

$$-x = -7$$

$$x = 7$$

$$(35.) C = \frac{255p}{100-p}, \quad 0 \leq p \leq 100$$

$$d.) (VA) 100 - p = 0$$

$$-p = -100$$

$$p = 100$$

$$(HA) n = m$$

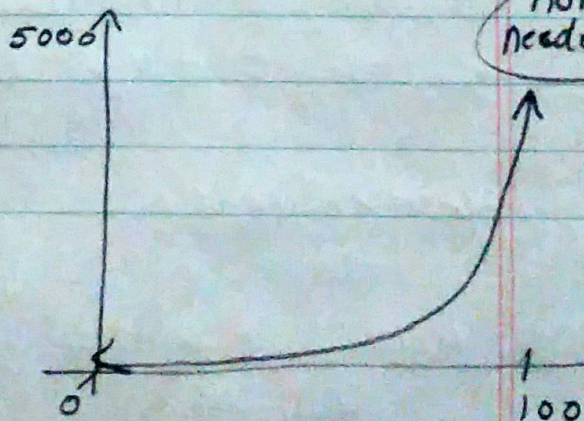
$$C = -255$$

not needed

$$a.) C = \frac{255(10)}{100-10} = \frac{2550}{90} \approx 28.33$$

$$b.) C = \frac{255(40)}{100-40} = \frac{10,200}{60} \approx 170$$

$$c.) C = \frac{255(75)}{100-75} = \frac{19,125}{25} \approx 765$$



e.) No, because the equation is undefined at $p = 100$