

WS - GRAPHING RATIONAL FUNCTIONS

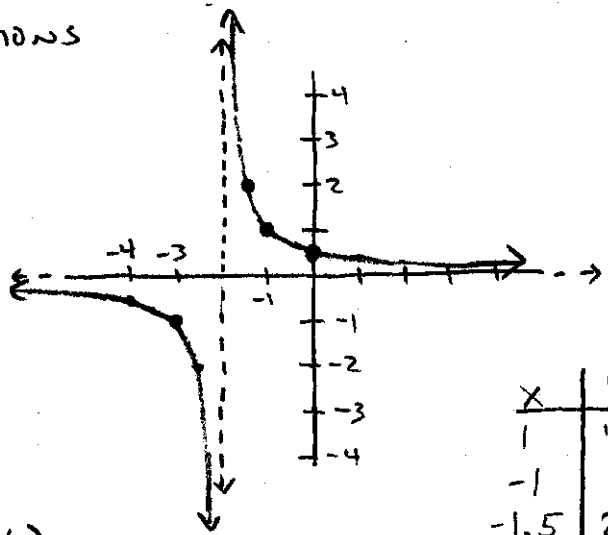
#1 $f(x) = \frac{1}{x+2}$

VA $\rightarrow x+2=0$
 $x = -2$

HA $\rightarrow \text{DEG } P(x) < \text{DEG } Q(x)$
 $\therefore y = 0$

x-INT : NONE

y-INT : $y = \frac{1}{0+2} = \frac{1}{2} \quad (0, \frac{1}{2})$



x	y
1	1/3
-1	1
-1.5	2
-3	-1

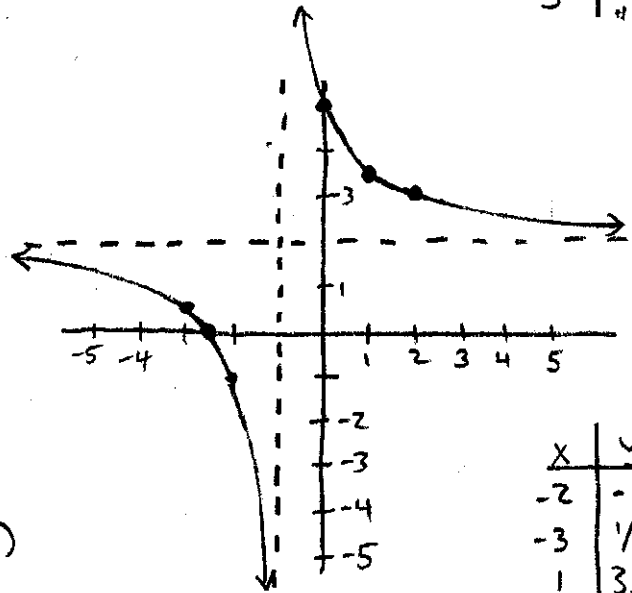
#2 $f(x) = \frac{2x+5}{x+1}$

VA $\rightarrow x+1=0$
 $x = -1$

HA $\rightarrow \text{DEG } P(x) = \text{DEG } Q(x)$
 $\therefore y = \frac{2}{1} = 2$

x-INT : $2x+5=0$
 $x = -2.5 \quad (-2.5, 0)$

y-INT : $(0, 5)$



x	y
-2	-1
-3	1/2
1	3.5
2	3

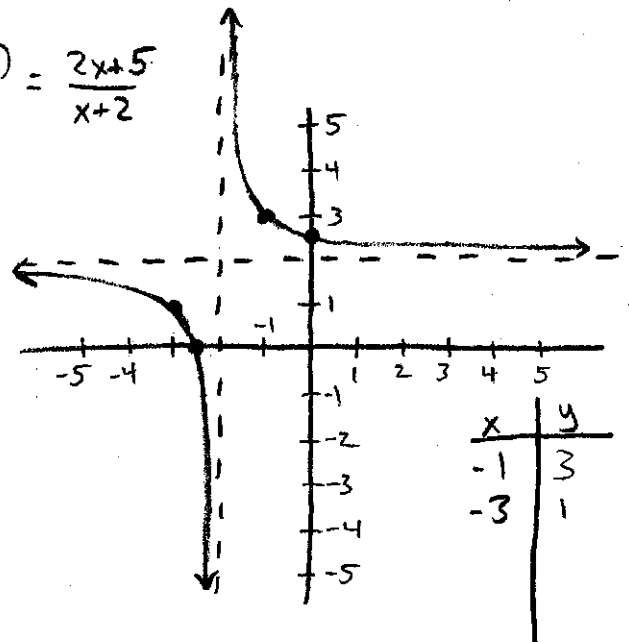
#3 $f(x) = \frac{1}{x+2} + 2 = \frac{1}{(x+2)} + \frac{2(x+2)}{(x+2)} = \frac{2x+5}{x+2}$

VA $\rightarrow x+2=0$
 $x = -2$

HA $\rightarrow \text{DEG } P(x) = \text{DEG } Q(x)$
 $\therefore y = \frac{2}{1} = 2$

x-INT : $2x+5=0$
 $x = -\frac{5}{2} \quad (-2.5, 0)$

y-INT : $(0, 2.5)$



x	y
-1	3
-3	1

#4 $f(x) = 2 - \frac{3}{x^2} = \frac{2x^2}{x^2} - \frac{3}{x^2} = \frac{2x^2 - 3}{x^2}$

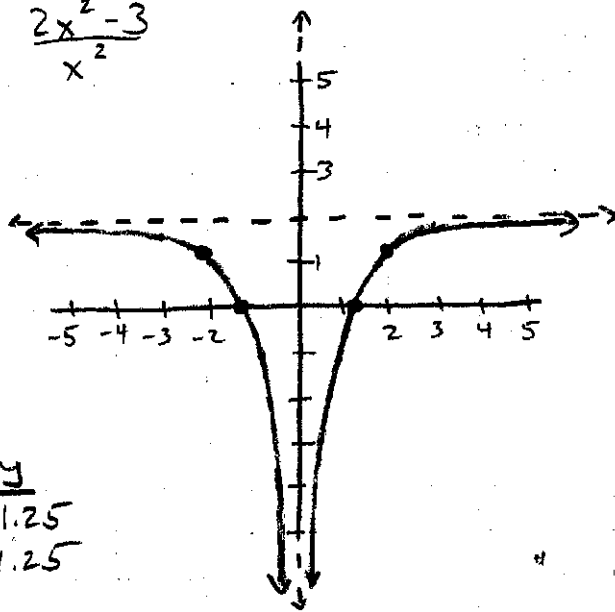
VA $\rightarrow x^2 = 0$
 $x = 0$

HA $\rightarrow \text{DEG } P(x) = \text{DEG } Q(x)$
 $\therefore y = \frac{2}{1} = 2$

X-INT: $2x^2 - 3 = 0$
 $x^2 = \frac{3}{2}$
 $x = \pm 1.225$

Y-INT: NONE

x	y
2	1.25
-2	1.25



#5 $f(x) = \frac{x^2 - 4}{x^2 - 4(x + 4)} = \frac{(x+2)(x-2)}{(x-2)(x+2)} = \frac{x+2}{x-2}$

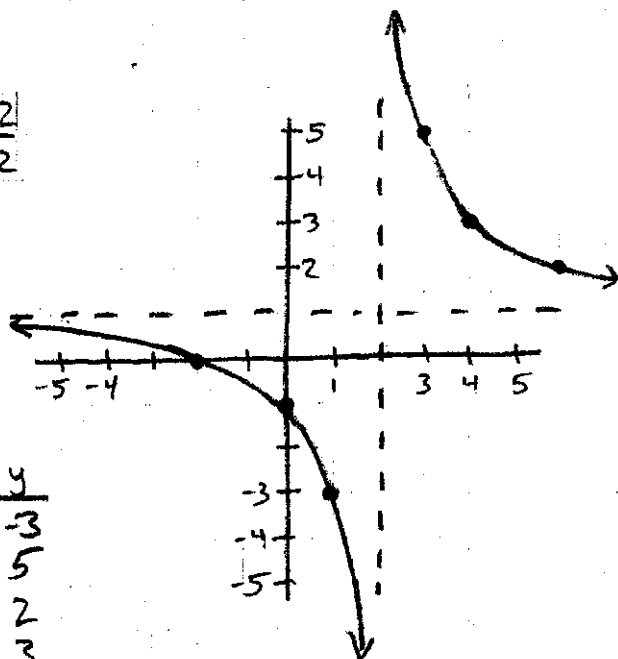
VA $\rightarrow x - 2 = 0$
 $x = 2$

HA $\rightarrow \text{DEG } P(x) = \text{DEG } Q(x)$
 $\therefore y = \frac{1}{1} = 1$

X-INT: $x + 2 = 0$
 $x = -2$ (-2, 0)

Y-INT: (0, -1)

x	y
1	-3
3	5
6	2
4	3



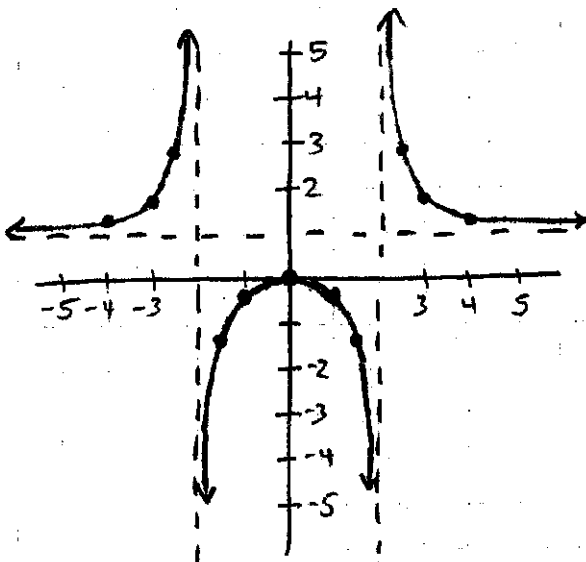
#6 $f(x) = \frac{x^2}{x^2 - 4}$

VA $\rightarrow x^2 - 4 = 0$
 $x = \pm 2$

HA $\rightarrow y = 1$

X-INT: $x^2 = 0$
 $x = 0$

Y-INT: (0, 0)



x	y
3	$\frac{9}{5} = 1.8$
2.5	2.78
4	$\frac{16}{2} = 1.33$
1	$-\frac{1}{3}$
-1	$-\frac{1}{3}$
1.5	-1.29
-3	$\frac{9}{5}$

#7 $f(x) = \frac{4(x+1)}{x(x-4)} = \frac{4x+4}{x^2-4x}$

VA $\rightarrow x=0, x=4$

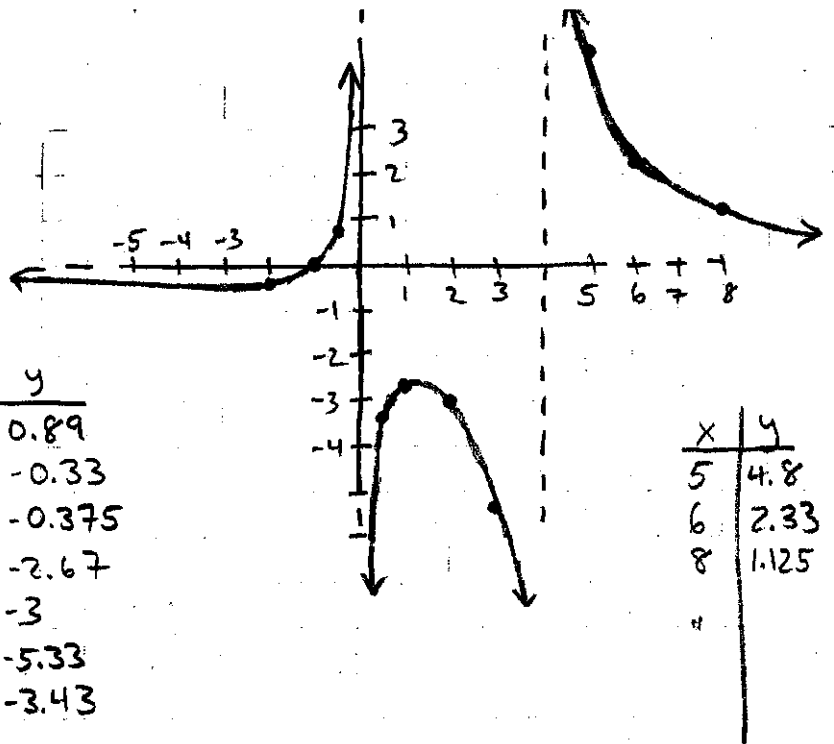
HA $\rightarrow y=0$

X-INT: $4x+4=0$

$x=-1$

Y-INT: NONE

x	y
-0.5	0.89
-2	-0.33
-4	-0.375
1	-2.67
2	-3
3	-5.33
0.5	-3.43



x	y
5	4.8
6	2.33
8	1.125

#8 $f(x) = \frac{3x}{x^2-x-2} = \frac{3x}{(x-2)(x+1)}$

VA $\rightarrow x=2, x=-1$

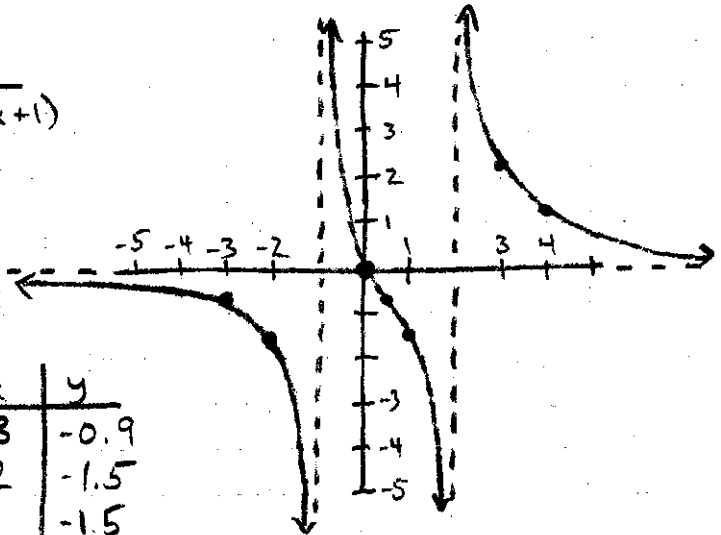
HA $\rightarrow y=0$

X-INT: $3x=0$

$x=0$

Y-INT: $y=0$

x	y
-3	-0.9
-2	-1.5
1	-1.5
0.5	-0.67
3	2.25
4	1.2



#9 $f(x) = \frac{x^2-4x}{x^3+x^2-20x} = \frac{x(x-4)}{x(x+5)(x-4)} = \frac{1}{x+5}$

VA $\rightarrow x=-5$

HA $\rightarrow y=0$

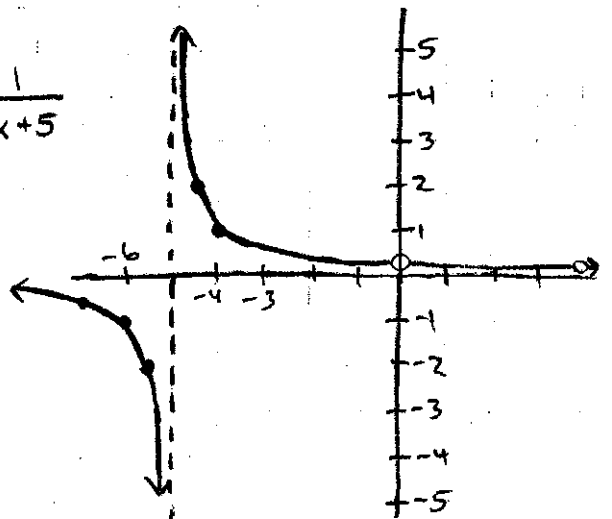
Holes $\rightarrow x=0 \rightarrow (0, 1/5)$

$x=4 \rightarrow (0, 1/4)$

X-INT: NONE

Y-INT: $(0, 1/5)$

x	y
-4	1
-4.5	2
-6	-1
-7	-0.5



$$\#10 \quad f(x) = \frac{x-3}{x^2-5x+6} = \frac{\cancel{x-3}}{(\cancel{x-3})(x-2)} = \frac{1}{x-2}$$

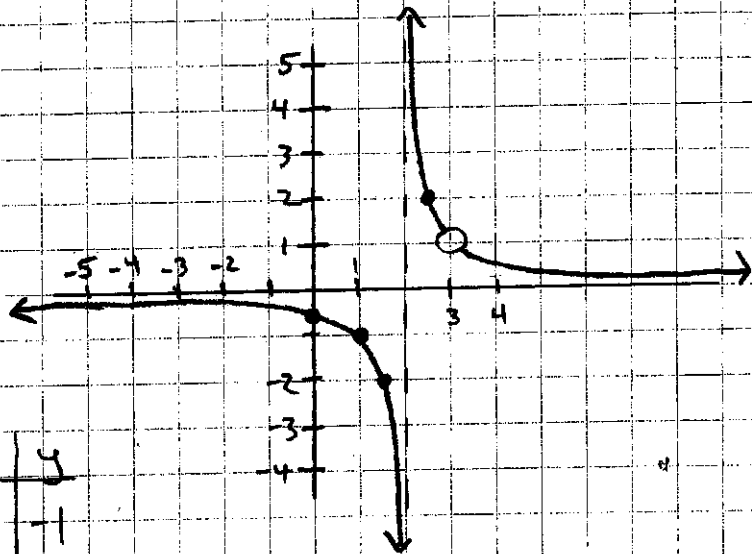
$$VA \rightarrow x=2$$

$$HA \rightarrow y=0$$

$$\text{HOLES} \rightarrow x=3 \quad (3, 1)$$

x-INT: NONE

$$y\text{-INT: } (0, -\frac{1}{2})$$



x	y
1	-1
1.5	-2
2.5	2
3	1
4	1/2
0	-1/2