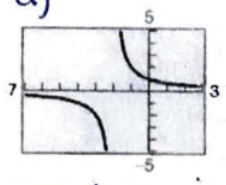
Part 1

Sec 2.6 Rational Func. & Asymptotes pg 195 # 7-15, 21, 27, 54

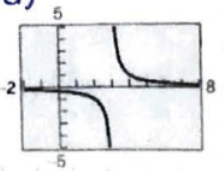
Match the graph to Function #7-12

#7) $f(x) = \frac{2}{x+2}$ #8) $f(x) = \frac{1}{x-3}$ #9) $f(x) = \frac{4x+1}{x}$

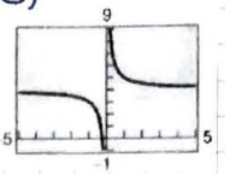
a)



d)

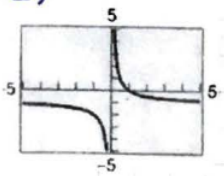


c)

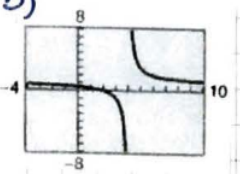


#10) $f(x) = \frac{1-x}{x}$ #11) $f(x) = \frac{x-2}{x-4}$ #12) $f(x) = -\frac{x+2}{x+4}$

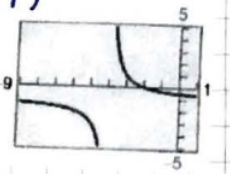
e)



b)



f)



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

a) $x^2 = 0$

$x = 0$

D: $\{x \in \mathbb{R} \mid x \neq 0\}$

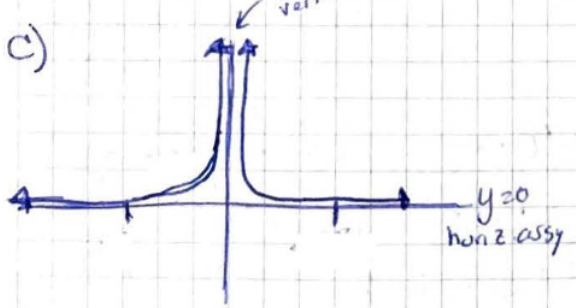
b) hori. asym. (Deg. Num < Deg. Denom)

$y = 0$

vert. asym. (All Real zeros)

$x = 0$

c)



x	f(x)	
-.01	10000	$x \to 0, f(x) \to \infty$
-.10	100	
-.5	4	
-1	1	
.01	10000	$x \to 0, f(x) \to \infty$
.10	100	
.5	4	
1	1	

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

a) $x - 2 = 0$

$x = 2$

D: $\{x \in \mathbb{R} / x \neq 2\}$

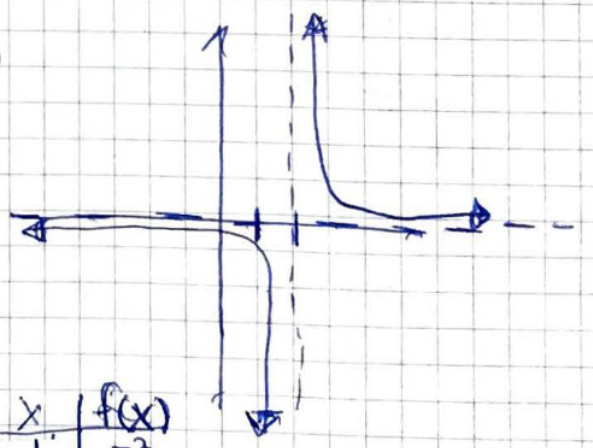
b) horizontal Asym $\Rightarrow$ (Deg. num. > Deg. l

$y = 0$

Vertical Asym. (All real zero)

$x = 2$

c)



x	f(x)
1	-3
1.5	-24
1.75	-192
2.5	192
2.75	7.11
3	3
1	

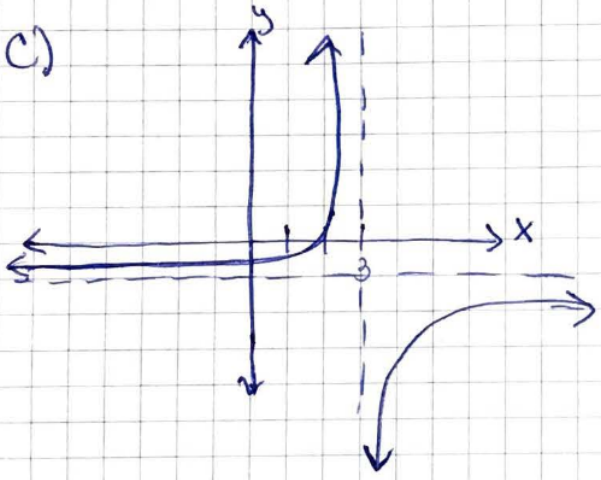
#15) $f(x) = \frac{3+x}{3-x}$

a) $\{x \in \mathbb{R} \mid x \neq 3\}$ → $3-x \neq 0$, $-x \neq -3$, $x \neq +3$

b) Vertical Asym = $x = 3$

Horizontal Asym: $y = -1$

c)



d)

x	f(x)
2	5
2.5	11
2.75	23
3.25	11
3.5	-13
4	-7

#27) $g(x) = \frac{x^2-9}{x+1}$

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

The zeros of $g(x)$ correspond to the zeros of the numerator and are $x=3$, $x=-3$.

#21) $f(x) = \frac{x-3}{x^2-3x}$, $g(x) = \frac{1}{x}$

c)

x	-1	-0.5	0	0.5	2	3	4
f(x)	-1	-2	und	2	1/2	und	1/4
g(x)	-1	-2	und	2	1/2	1/3	1/4

a) Domain $f(x)$

$\{x \in \mathbb{R} \mid x \neq 0, x \neq 3\}$

Domain $g(x)$

$\{x \in \mathbb{R} \mid x \neq 0\}$

b) Since $x-3$ is a common factor of both numerator and denominator of $f(x)$, $x=3$ is not a vertical assymtote of $f(x)$.

The only vertical asymptote is $x=0$.

d) The only place they are different is at $x=3$, where $f(x)$ is undefined and g is $1/3$.

#54) $8, 5i, -5i$

$(x-8)(x-5i)(x+5i)$

$(x-8)(x^2+5ix-5ix+25i^2)$

$(x-8)(x^2-25)$

$x^3-25x-8x^2+200$

$\boxed{x^3-8x^2-25x+200}$