

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

Don't Worry about this one

Horizontal degree num > degree den
no horizontal so a slant or oblique asymptote

Synthetic divide $(x^2 + 6x + 9) \div (x - 5)$

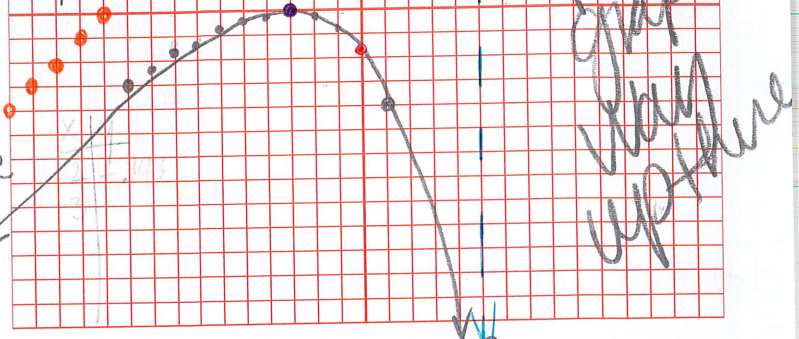
5	1	6	9
		5	5
	1	11	14

ignore

$y = x + 11$

Vertical $x = 5$ y-intercept $(0, -1\frac{1}{5})$
 x -inter $0 = \frac{(x+3)^2}{x-5}$
 $(x+3)^2 = 0 \implies x = -3$

X	Y
-10	-3.267
-9	-2.57
-8	-1.923
-7	-1.33
-6	-.818
-5	-.4
-4	-.1
-3	0
-2	.143
-1	.66
0	1.8
1	4



there's another part of graph way up there

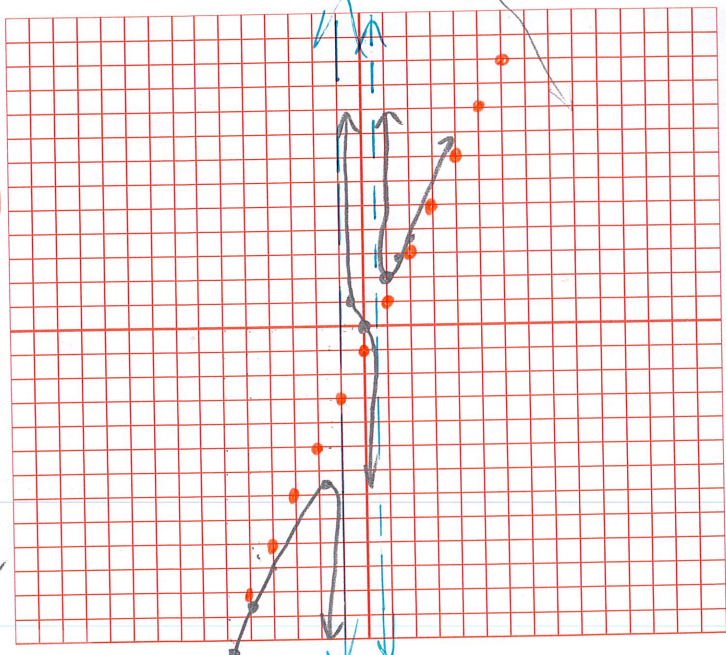
#22 $f(x) = \frac{4x^3}{(2x-1)(x+1)}$ num > den no horizontal

$2x^2 + 2x - 1x - 1 = 2x(x+1) - 1(x+1) = (2x-1)(x+1)$
 $4x^3 \div (2x-1)(x+1)$

$y = 2x - 1$ Oblique

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

Points from Calc y-inter $(0,0)$
 use Table to graph points and graph it to see what behavior is



#24 $f(x) = \frac{2x^2 + 5}{3x + 4}$ deg num > deg den no horizontal

Slant or oblique Asy divide

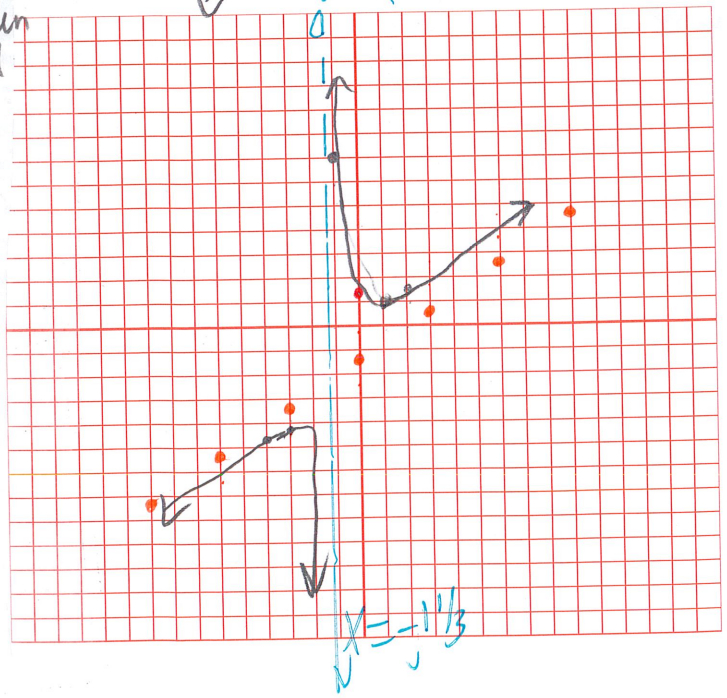
$3x + 4 \overline{) 2x^2 + 0x + 5}$
 $-2x^2 + 8/3x$
 $0 - 8/3x + 5$

Vertical Asy $x = -\frac{4}{3} = -1\frac{1}{3}$

$y = \frac{2}{3}x - \frac{8}{6}$ asymptote

y-inter $y = \frac{2(0^2) + 5}{3(0) + 4} = \frac{5}{4}$

table Set $\Delta t = 1/3$ at $1/3$

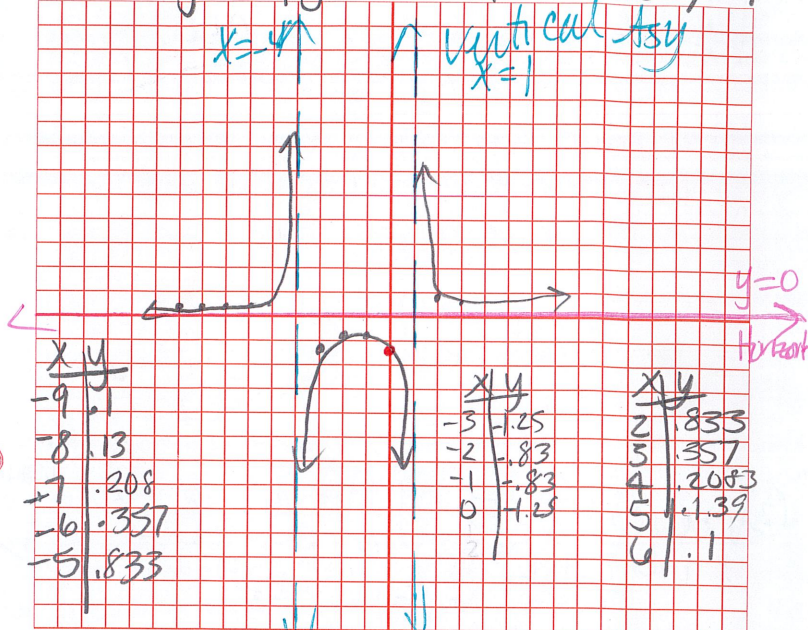


#14) $f(x) = \frac{5}{(x-1)(x+4)}$

degree of num < deg den

- ① $y=0$ Horizontal Asy $y=0$
- ② Vertical Asy $x=1$ $x=-4$ no holes
- ③ y-intercept Set $x=0$ Solve for y
 $y = \frac{5}{(0-1)(0+4)} = \frac{5}{(-1)(4)} = \frac{5}{-4} = -\frac{5}{4}$
- ④ X-intercept Set $y=0$
 $0 = \frac{5}{(x-1)(x+4)}$ $0=5$ None

④ Plug in Calc table get points

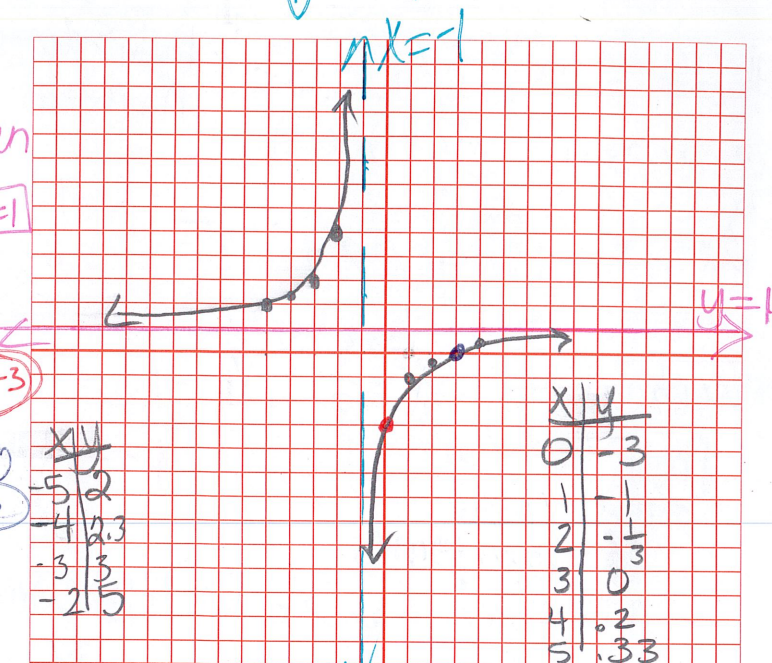


#16 $f(x) = \frac{x-3}{x+1}$

- ① Horizontal Asy degree num = deg den
 $y = \frac{\text{leading Coeff num}}{\text{leading Coeff den}} = \frac{1}{1} = 1$
- ② Vertical Asy No holes $x = -1$

- ③ y-intercept Set $x=0$ $y = \frac{0-3}{0+1} = -3$
- X-intercept Set $y=0$ $0 = \frac{x-3}{x+1}$ $x-3=0$ $x=3$

④ use Calc to get points



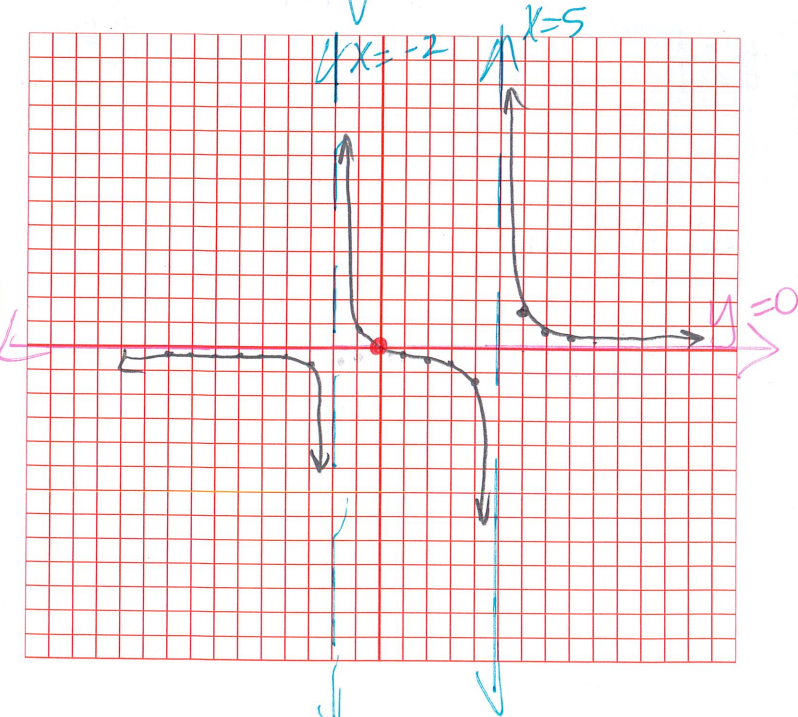
#18 $f(x) = \frac{2x}{(x+2)(x-5)}$

- ① Horizontal deg num < deg den $y=0$
- ② Vertical Asy $x=-2$ $x=5$

- ③ y-intercept Set $x=0$ $y = \frac{2(0)}{(0+2)(0-5)} = \frac{0}{-10} = 0$
- X-inter (0,0)

④ points

x	y
-9	-.184
-8	-.205
-7	-.233
-6	-.273
-5	-.33
-4	-.44
-3	-.75
-1	1/3
0	0
1	-.167
2	1/3
3	-.5
4	-1.13
6	1.5
7	1.77
8	1.53
9	1.40
10	1.33



optional
26 $f(x) = \frac{x^4 - x^2 - 12}{x^3 + 6x^2 + 6x - 6}$

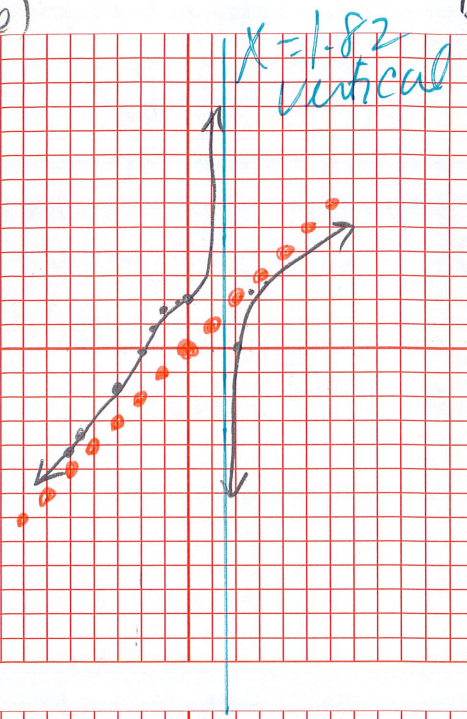
$x(x^3 + 6x^2 + 6x - 6)$
 $x^4 + 6x^3 + 6x^2 - 6x$

$x+0$	x^3-6
$x^3+6x^2+6x-12$	
$-x^3+6x^2+6x-12$	
$0+0+6x-12$	

$y = 1x + 0$
Oblique Asy

Vertical Asy $x^3 - 6 = 0$
 $+6 +6$
 $\sqrt[3]{x^3 = 6^{1/3}}$
 $x = 6^{1/3}$
 $x = 1.82$

Point on calc table

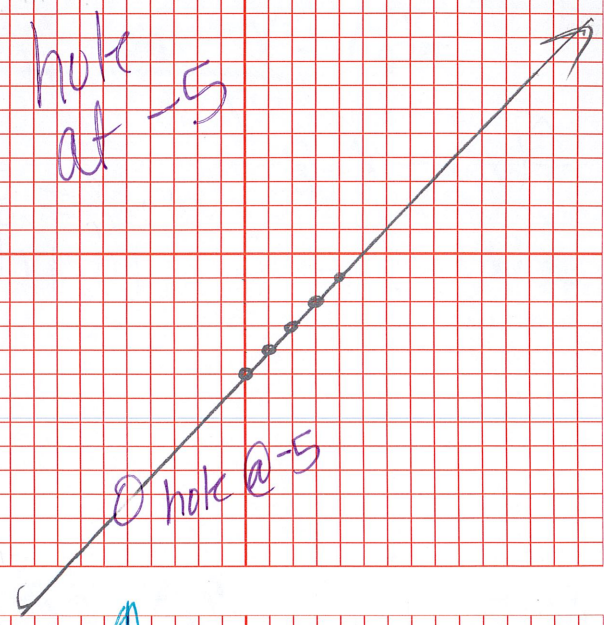


30 $f(x) = \frac{(x+5)(x-5)}{x+5}$

factor first
now simplify
because $x+5$ divides out is a hole $x = -5$
no horizontal Asy because den > num

$y = \frac{x-5}{1}$ graph $y = 1x - 5$
hole $y = 1x - 5$

hole at -5



39 $f(x) = \frac{x+1}{x^2 + 6x + 5}$

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

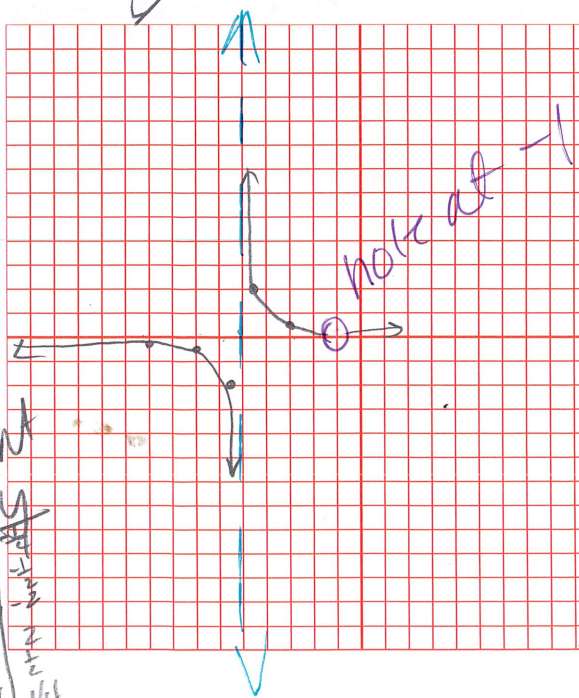
because $x+1$ divides out so $x = -1$ is a hole

Now graph $f(x) = \frac{1}{x+5}$

$y = \frac{1}{x-5}$ Vertical Asy $x = -5$

$y = \frac{1}{x}$ parent

x	y
-4	-1/4
-2	-1/2
-1	-1
0	undefined
1	1
2	1/2
4	1/4

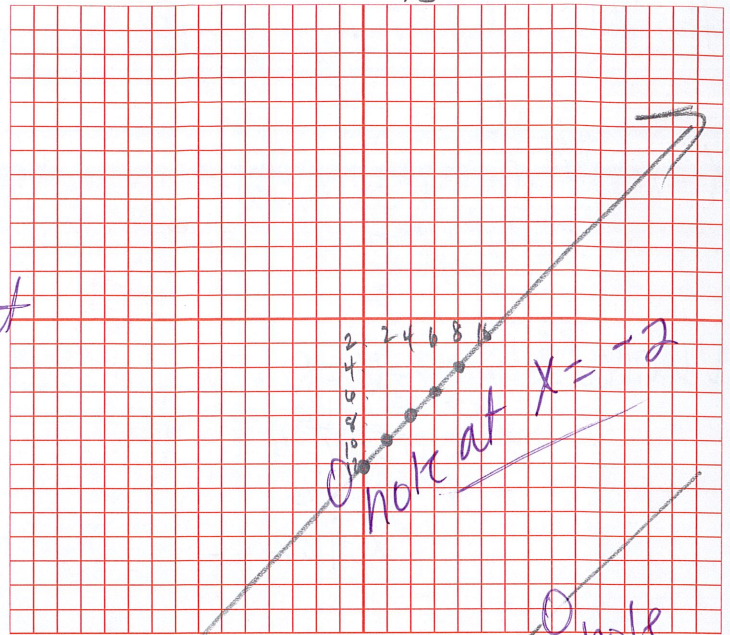


#40 For Max help factor
 $f(x) = \frac{x^2 - 10x - 24}{x + 2}$ $\frac{-24}{-10}$
 $\frac{-24}{-10}$

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

note @ $x = -2$
 because
 it factor out

$y = x - 12$ line

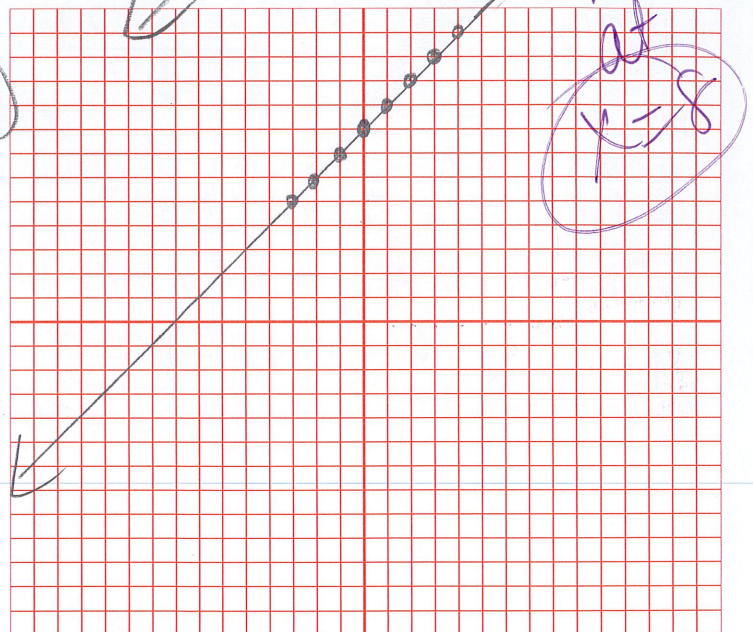


#31 for Max help

$f(x) = \frac{x^2 - 64}{x - 8} = \frac{(x+8)(x-8)}{(x-8)}$

$f(x) = x + 8$
 line

$x = 8$
 note



#35 $f(x) = \frac{2x^4 + 10x^3 + 12x^2}{x^2 + 5x + 6}$

$\frac{2x^2(x^2 + 5x + 6)}{(x^2 + 5x + 6)} = \frac{2x^2(x+2)(x+3)}{(x+2)(x+3)}$

notes @ $x = -2$
 $x = -3$

$y = 2x^2$

x	y
2	8
1	2
0	0
-1	2
-2	8
-3	18

