



ex 2)  $f(x) = \frac{4x}{x^2-36}$

① Symm:  $f(-x) = \frac{4(-x)}{(-x)^2-36} = \frac{-4x}{x^2-36} \rightarrow$  origin Symm  
 $-f(x) = \frac{-4x}{x^2-36}$

② y-int:  $f(0) = \frac{4(0)}{0^2-36} = 0$

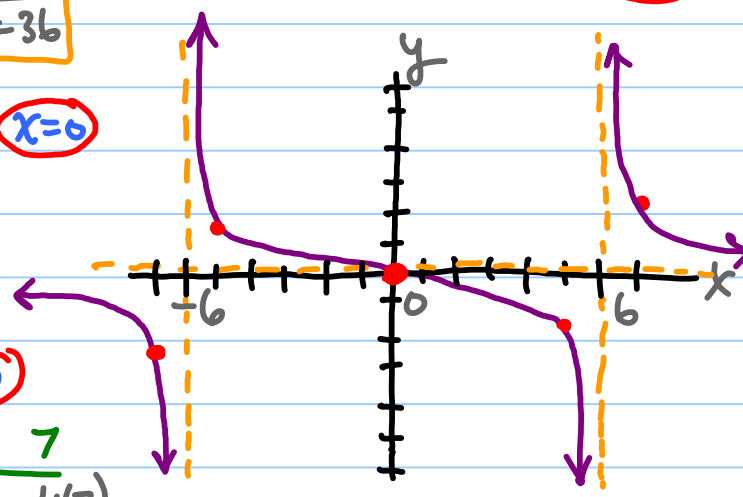
③ x-int:  $f(x) = 0 = \frac{4x}{x^2-36} \rightarrow 0 = 4x \rightarrow$  x=0

④ V.A.:  $x^2-36=0; (x-6)(x+6)=0;$   
x=6, x=-6

⑤ H.A.:  $\deg p(x) < \deg q(x) \rightarrow$  y=0

⑥ Plot points

x	-7	-5	5	7
y	$\frac{4(-7)}{(-7)^2-36}$	$\frac{4(-5)}{(-5)^2-36}$	$\frac{4(5)}{5^2-36}$	$\frac{4(7)}{7^2-36}$
	$\frac{-28}{13}$	$\frac{-20}{11}$	-1.8ish	+2...
	-2.0...	+1.8ish		



ex 3)  $f(x) = \frac{3x^2+x-4}{2x^2-5x}$

① Symm:  $f(-x) = \frac{3(-x)^2+(-x)-4}{2(-x)^2-5(-x)} = \frac{3x^2-x-4}{2x^2+5x}$   
 $-f(x) = \frac{-(3x^2+x-4)}{2x^2-5x}$  no Symm

② y-int:  $f(0) = \frac{3(0)^2+0-4}{2(0)^2-5(0)} \leftarrow 0 \rightarrow$  none

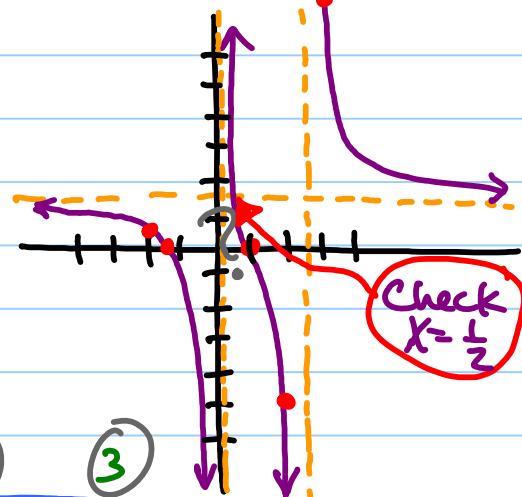
③ x-int:  $f(x) = 0 = \frac{3x^2+x-4}{2x^2-5x} \rightarrow 0 = 3x^2+x-4$   
 $0 = (3x+4)(x-1)$   
x = -4/3, 1

④ V.A.:  $2x^2-5x=0$   
 $x(2x-5)=0$   
x=0 2x-5=0  
x=5/2

⑤ H.A.:  $\deg p(x) = \deg q(x) \rightarrow$  y = 3/2

⑥ Plot Points:

x	-2	2	3
y	$\frac{3(-2)^2+(-2)-4}{2(-2)^2-5(-2)}$	$\frac{3(2)^2+(2)-4}{2(2)^2-5(2)}$	$\frac{3(3)^2+3-4}{2(3)^2-5(3)}$
	$\frac{12-2-4}{8+10} = \frac{6}{18} = \frac{1}{3}$	$\frac{12+2-4}{8-10} = \frac{10}{-2} = -5$	$\frac{18-15}{18-15} = \frac{3}{3} = 1$



# \* Slant Asymptotes

H.A? ... If  $\deg p(x) > \deg q(x)$  by 1 power,  
 then find slant asymptote: long division  
 (ignore remainder)  
 $\rightarrow y = mx + b$

ex 4) Graph  $f(x) = \frac{x^2 - 9}{x}$  ← deg 2  
 ← deg 1

Slant Asymptotes:

$$\begin{array}{r} x \overline{) x^2 + 0x - 9} \\ \underline{-(x^2 + 0x)} \phantom{-9} \\ -9 \end{array}$$

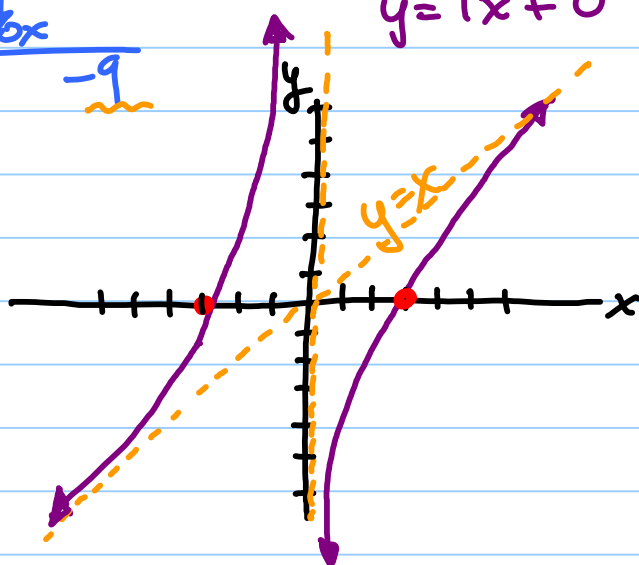
slant asymptote  $y = 1x + 0$

① Symm:  $f(-x) = \frac{(-x)^2 - 9}{-x} = \frac{x^2 - 9}{-x}$   
 $-f(x) = -\frac{x^2 - 9}{x} \rightarrow$  origin symm

② y-int:  $f(0) = \frac{0^2 - 9}{0} \rightarrow$  none

③ x-int:  $f(x) = 0 = \frac{x^2 - 9}{x} \Rightarrow 0 = x^2 - 9$   
 $(x-3)(x+3) = 0$   
 $x = 3, -3$

④ V.A.:  $x = 0$  ⑤ H.A.: none



HW: p354, #50-76 even, skip 62, 66, 70