

Math 1121

Homework # 23

#13, 19

#13 $f(x) = \frac{-x+4}{x+2}$

vert 'hole: $x+2=0$
 $x=-2$

horiz: $\lim_{x \rightarrow \infty} \frac{-x+4}{x+2} = \frac{-1}{1} = -1$

$$f'(x) = \frac{(x+2) \cdot (-1) - (-x+4) \cdot 1}{(x+2)^2}$$
$$= \frac{-x-2+x-4}{(x+2)^2} = \boxed{\frac{-6}{(x+2)^2}}$$



$$f'(-3) = \frac{-6}{(-1)^2} = -$$

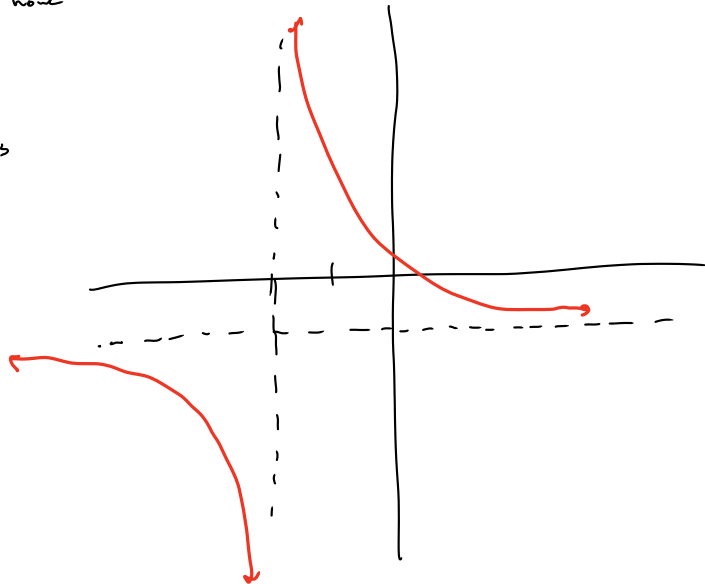
$$f'(0) = \frac{-6}{(2)^2} = -$$

$f'=0$: $\frac{-6}{(x+2)^2} = 0$

$-6 = 0$
none

f' DNE: $x+2=0$
 $x=-2$

no y-vals to plot,
the only crit # is
the asymptote



#19

$$f(x) = \frac{1}{x^2 - 9}$$

$$f'(x) = \frac{(x^2 - 9) \cdot 0 - 1(2x)}{(x^2 - 9)^2}$$

vert: $x^2 - 9 = 0$
 $(x+3)(x-3) = 0$
 $x = 3, -3$

$$f'(x) = \frac{-2x}{(x^2 - 9)^2}$$

horiz: $\lim_{x \rightarrow \infty} \frac{1}{x^2 - 9} = 0$

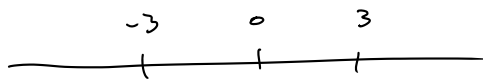
$f' = 0$ $\frac{-2x}{(x^2 - 9)^2} = 0$

$f' \text{ DNE}$ $(x^2 - 9)^2 = 0$
 $x = 3, -3$

$-2x = 0$

$x = 0$

inc/dec



f' : + DNE + 0 - DNE -

$f'(-4) = \frac{-2(-4)}{(-)^2} = +$ $f'(1) = \frac{-2 \cdot 1}{(+)^2} = -$

$f'(-1) = \frac{-2(-1)}{(-)^2} = +$ $f'(4) = \frac{-2 \cdot 4}{(+)^2} = -$

plot int #s: 3 & -3 are holes

$x < 0$: $f(0) = \frac{1}{0^2 - 9} = -\frac{1}{9}$

