Welcome! Choose your seat to be you assigned seat for the next while.

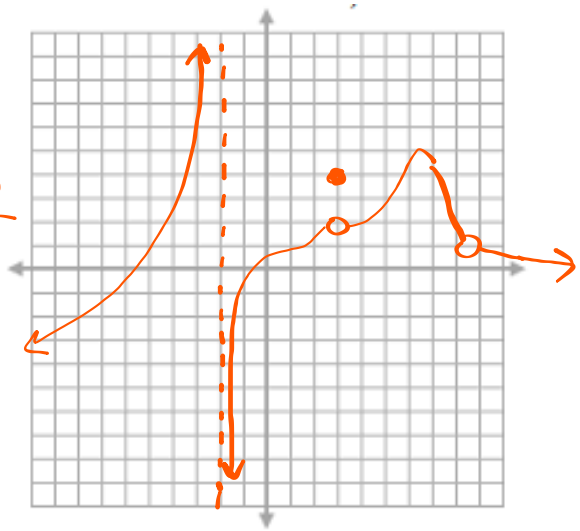
Aug 27-8:36 AM

Work on this by yourself or with a partner.

Does the limit exist at x = 3? Explain why or why not.

$\lim_{x \to 3} f(x) = 2$

$f(3) = 4$



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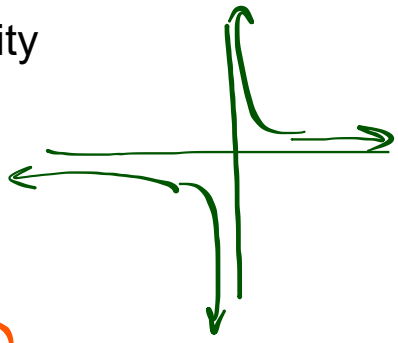
2.2 Limits to Infinity



Use the table on your calculator to investigate the limit numerically:

$\lim_{x\to\infty} \frac{1}{x} =$ 0 $\qquad$ $\lim_{x\to-\infty} \frac{1}{x} =$ 0

Definition of a Horizontal Asymptote:

If $\lim_{x\to\infty} f(x) = b$ *or* $\lim_{x\to-\infty} f(x) = b$ then there is a HA at y = b

Sep 1-8:31 AM

Estimate: (remember this includes both the left and right hand limits!)

$\lim_{x\to 0+} \frac{1}{x} =$ ∞

$\lim_{x\to 0-} \frac{1}{x} =$ $-\infty$

$\lim_{x\to 0} \frac{1}{x} =$ DNE

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Definition of a Vertical Asymptote:

$$\lim_{x \to a^+} f(x) = \pm\infty$$

or

$$\lim_{x \to a^-} f(x) = \pm\infty$$

then there is a VA at x = a

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Summary of finding asymptotes

Horizontal Asymptotes:

1. If degree of the numerator is < the degree of the denominator: y=0
"bottom heavy" $\frac{x}{x^2}$ $y=0$

2. If degree of the numerator is = to the degree of the denominator: y=
divide leading coefficients $\frac{2x}{x}$ $y=2$

3. If degree of the numerator is > the degree of the denominator: y=quotient
$\frac{x^2-1}{x+1} = \frac{(x+1)(x-1)}{x+1} = x-1$ EBM

Vertical Asymptotes:

Domain restrictions can't div by 0, no negs in $\sqrt{}$

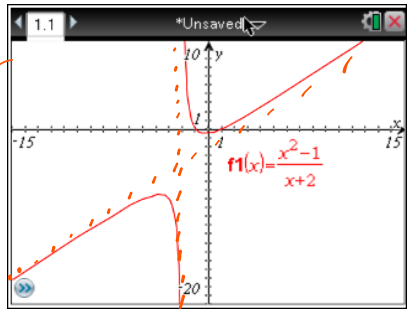
Set denom = 0

Jul 26-10:55 PM

Power Function End Behavior Models:

VA: $x=-2$ PF: $y=x$

$$f(x)=\frac{x^2-1}{x+2}$$ $=0$ -2 -2 $x=-2$

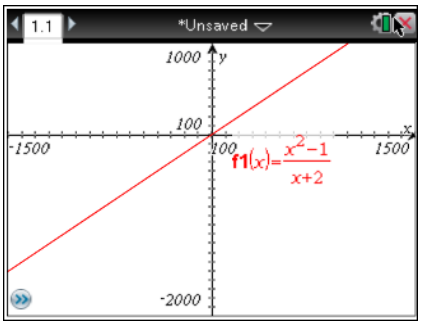


Graph f(x) using the following windows:

Synthetic Division

[-15,15] [-20,10]

-2 | 1 0 -1
-2 4
1 -2 3



[-1500, 1500] [-2000,1000]

EBM: $x-2+\frac{3}{x+2}$

what is an end-behavior model for f(x):

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Find all asymptotes and describe them using limits. Find a power function that resembles f(x).

PF: $y=\frac{1}{x}$

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

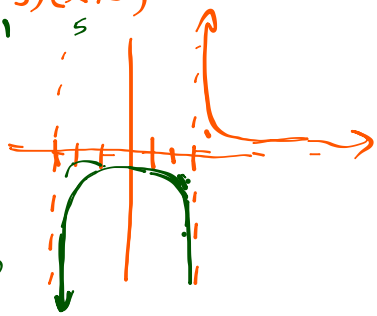
2. $f(x)=\frac{2x^2+3x-1}{x^2-4}$

VA: $x=3$ $x=-3$

$\lim_{x\to 3^+} f(x)=\infty$

$\lim_{x\to -3^+} f(x)=-\infty$

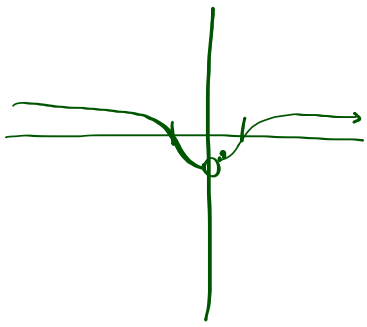
HA: $y=0$



3. $f(x)=\cos\left(\frac{1}{x}\right)$

HA: $y=1$ $\lim_{x\to\infty} f(x)=1$

PF: None



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4. $f(x)=\dfrac{2x-1}{|x|-3}$ $|x|-3=0$ $|x|=3$ $x=3,-3$

VA: $x=3,-3$

HA: $y=2,-2$

PF: $\dfrac{2x}{x}$ $y=2$

5. $f(x)=\dfrac{5x+\sin x}{x}$

$f(x)=\dfrac{5x}{x}+\dfrac{\sin x}{x}$

HA: $\dfrac{5}{1}$ so $y=5$

VA: $x=0$

6. $f(x)=\dfrac{4x^3+2x-1}{x+3}$

Jul 26-10:49 PM