Today's Plan:

Learning Target (standard): I will evaluate and describe infinite limits. I will analyze asymptotic behavior. I will use each of these to graph rational functions.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make neccessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuarcy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

Assessment: Board work, homework check and homework assignment

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

Assignment:

* Go over your graphs with each other at your tables! *

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

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

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

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

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

* TEST on Thursday! *

Set 2: Multiple-Choice Questions
on Limits Packet

#19,32,34

$$19)\, y = \frac{2x^2 - 4}{2 + 7x - 4x^2}$$

$-4x^2 + 7x + 2 = 0$

$-1(4x^2 - 7x - 2) = 0$

$-1(4x + 1)(x - 2) = 0$

$(2 - x)(1 + 4x) = 0$

VA: $x = -\frac{1}{4}, 2$

HA: $y = -\frac{1}{2}$

A

Set 2: Multiple-Choice Questions
on Limits Packet

#32,34

$$32)\, f(x) = \frac{4}{x^2 - 1}$$

$x^2 - 1 = 0$

$(x+1)(x-1) = 0$

$x = -1, 1$

HA: $y = 0$

VA: $x = -1, x = 1$

C

Set 2: Multiple-Choice Questions on Limits Packet

$$34)\ y=\frac{2x^2+2x+3}{4x^2-4x}$$

$4x^2-4x=0$

$4x(x-1)=0$

$x=0,1$

HA: $y=\frac{1}{2}$

VA: $x=0,\ x=1$

C

$$f(x)=\begin{cases}-4x^2, x\le 2\\ -16, x>2\end{cases}$$

$\lim_{x\to 2^-} f(x) = -16$

$\lim_{x\to 2^+} f(x) = -16$

$\lim_{x\to 2} f(x) = -16$

Graph:

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

① D: $\{x \mid x \neq -1, 2\}$

Holes: —

② I_x: (0,0)

I_y: (0,0)

③ End Behavior:

$$\lim_{x\to\infty}\frac{\frac{2x^2}{x^2}}{\frac{x^2}{x^2}-\frac{x}{x^2}-\frac{2}{x^2}}=\lim_{x\to\infty}\frac{2}{1-\frac{1}{x}-\frac{2}{x}}$$

$$=\frac{2}{1-0-0}$$

$$=2$$

$$\lim_{x\to-\infty}\frac{2}{1-\frac{1}{x}-\frac{2}{x}}$$

$$=\frac{2}{1-0-0}$$

$$=2$$

∴ HA: $y=2$

intersects?

$(-2,2)$

$$2=\frac{2x^2}{x^2-x-2}$$

$$2x^2-2x-4=2x^2$$

$$-2x-4=0$$

$$-2x=4$$

$$x=-2$$

④ Asymptotic Behavior:

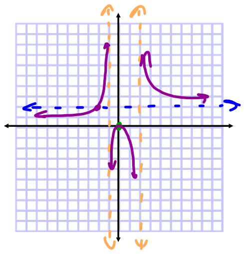
VA: $x=-1$, $x=2$

$\lim_{x\to-1^-} f(x)=\infty$

$\lim_{x\to-1^+} f(x)=-\infty$

$\lim_{x\to2^-} f(x)=-\infty$

$\lim_{x\to2^+} f(x)=\infty$



Evaluate the limit.

$$\lim_{x\to2}\left(\frac{x^3-8}{x^2-4}\right)=\lim_{x\to2}\frac{\cancel{(x-2)}(x^2+2x+4)}{\cancel{(x-2)}(x+2)}$$

$$=\lim_{x\to2}\frac{x^2+2x+4}{x+2}$$

$$=\frac{4+4+4}{2+2}$$

$$=3$$

Evaluate the limit.

$$\lim_{x\to 25}\left(\frac{x-25}{\sqrt{x}-5}\right) = \lim_{x\to 25}\frac{(\sqrt{x}+5)\cancel{(\sqrt{x}-5)}}{\cancel{\sqrt{x}-5}}$$

$$= \lim_{x\to 25}(\sqrt{x}+5)$$

$$= \sqrt{25}+5$$

$$= 10$$

Evaluate the limit.

$$\lim_{x\to 1}\frac{x-1}{\sqrt{x^2+3}-2}\cdot\frac{\sqrt{x^2+3}+2}{\sqrt{x^2+3}+2}$$

$$= \lim_{x\to 1}\frac{(x-1)(\sqrt{x^2+3}+2)}{x^2+3-4}$$

$$= \lim_{x\to 1}\frac{(x-1)(\sqrt{x^2+3}+2)}{x^2-1}$$

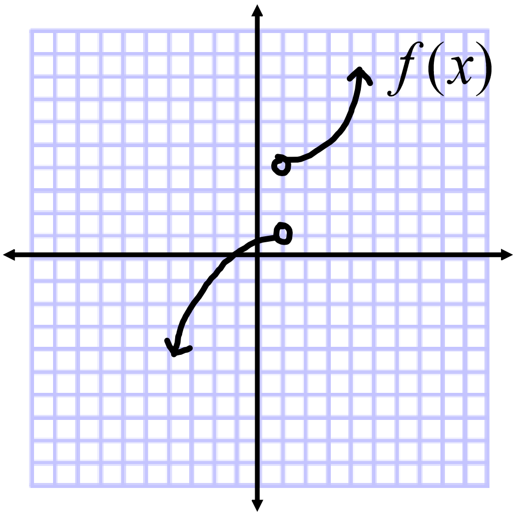
$$= \lim_{x\to 1}\frac{\cancel{(x-1)}(\sqrt{x^2+3}+2)}{(x+1)\cancel{(x-1)}}$$

$$= \lim_{x\to 1}\frac{\sqrt{x^2+3}+2}{x+1}$$

$$= \frac{\sqrt{1+3}+2}{1+1}$$

$$= \frac{4}{2}$$

$$= 2$$



$$\lim_{x \to -1} f(x) = 0$$

$$\lim_{x \to 3} f(x) = 5$$

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

$$\lim_{x \to 1} f(x) = \text{DNE}$$

*Explain why

The limit of the function as x approaches 1 on f(x) does not exist. As the x-values approach 1 on f(x) from the left, the y-values of the function approach 1 from the left. As the x-values approach 1 on f(x) from the right, the y-values of the function approach 4 from the right. In order for a limit to exist, the same y-value must be approached from the left and the right.

Evaluate:

$$\lim_{x \to 5^-} \frac{|x-5|}{x-5} = -1$$

Assignment:

Assignment 4 #1-29

* skip #17,22 & 27

* TEST on limits and rational functions tomorrw. *