

Please check HW answers with someone around you!

AP Calculus AB
Friday, September 7, 2012

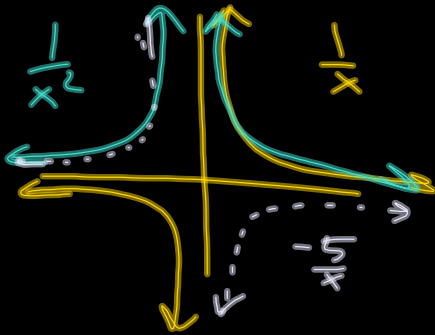
More with evaluating limits algebraically.
Error analysis due Monday

Write the number
of problems you'd
like to do on the
board.

$$(15) \lim_{x \rightarrow 0} \frac{x+1}{x^2} = \frac{1}{0}$$

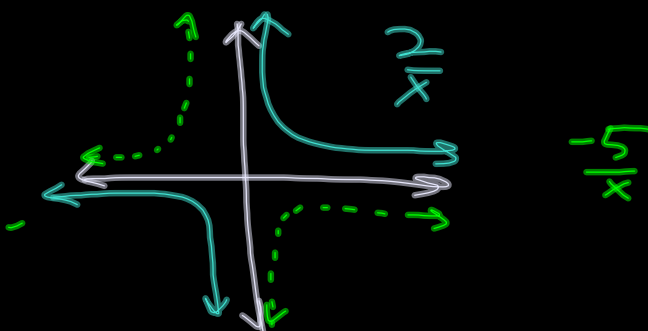
$$\lim_{x \rightarrow 0} \left(\frac{x}{x^2} + \frac{1}{x^2} \right)$$

$$\lim_{x \rightarrow 0} \left(\frac{1}{x} + \frac{1}{x^2} \right) = \lim_{x \rightarrow 0} \frac{1}{x} + \lim_{x \rightarrow 0} \frac{1}{x^2}$$



$$\lim_{x \rightarrow 0} \frac{x+1}{x^2} = \infty$$

x	-0.5	-0.1	0	0.1	0.5
$\frac{x+1}{x^2}$	+	+		+	+



Like #13: $\lim_{x \rightarrow 4} \frac{x}{x-4}$

Plug in $x=4 \rightarrow \frac{4}{4-4} = \frac{4}{0}$

table of values:

x	3.5	3.9	4.5	4.1
$\frac{x}{x-4}$	$\frac{3.5}{-0.5}$ -7	$\frac{3.9}{-0.1}$ -39	$\frac{4.5}{0.5}$ 9	$\frac{4.1}{0.1}$ 41

$$\lim_{x \rightarrow 4^-} \frac{x}{x-4} = -\infty$$

$$\lim_{x \rightarrow 4^+} \frac{x}{x-4} = \infty$$

THE $\lim_{x \rightarrow 4} \frac{x}{x-4}$ dne

$$\lim_{x \rightarrow \infty} \frac{x}{x-4} = 1$$

$$\lim_{x \rightarrow -\infty} \frac{x}{x-4} = 1$$

⑩ $\lim_{x \rightarrow 0} \left(\frac{\frac{1}{x+5} - \frac{1}{5}}{x} \right) = \frac{0}{0} \rightarrow \text{algebra}$

$$\lim_{x \rightarrow 0} \frac{\frac{5}{5} \left(\frac{1}{x+5} \right) - \frac{1}{5} \left(\frac{x+5}{x+5} \right)}{x}$$

$$\lim_{x \rightarrow 0} \frac{5 - (x+5)}{5(x+5)x}$$

$$\lim_{x \rightarrow 0} \left(\frac{-x}{5(x+5)} \div x \right)$$

$$\lim_{x \rightarrow 0} \frac{-x}{5(x+5)} \cdot \frac{1}{x}$$

$$\lim_{x \rightarrow 0} \frac{-1}{5(x+5)} = \frac{-1}{25}$$

$$\lim_{x \rightarrow \infty} \frac{f(x)}{g(x)}$$

f & g are
polynomials

Compare the degree of the numerator (N) to the degree of the denominator (D).

1. If $N > D$...
 $\pm \infty$

$$\lim_{x \rightarrow \infty} \frac{x^3}{x^2+1} = \infty$$

$$\lim_{x \rightarrow -\infty} \frac{x^3}{x^2+1} = -\infty$$

$$\lim_{x \rightarrow -\infty} \frac{x^6}{x^2+1} = \infty$$

2. If $N = D$...

$$\lim_{x \rightarrow \infty} \frac{3x^2-1}{4x^2+5} = \frac{3}{4}$$

Ratio of leading coefficients (of highest degree term)

3. If $N < D$...

$$\lim_{x \rightarrow \infty} \frac{x^2-1}{x^4+2} = 0$$