Welcome Back!

Please place your 11.3 hw on top of the cart

This week in Pre-Calculus...

Monday: 11.4 (Limits at Infinity)

Tuesday: Quiz Review

Wednesday: Quiz Review + Opinion Essay

Thursday: Quiz (11.1-11.4)

Friday: 11.5 (The Area Problem)

Mar 15-10:06 AM

$f(x) = 4 - x^2 \quad (1,3) \quad \lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$

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

$4-(x^2+2xh+h^2)$

$4 - x^2 - 2xh - h^2 + (-4+x^2)$

$\frac{-2xh-h^2}{h} = \frac{h(-2x-h)}{h} = \lim_{h\to 0} -2x-h$

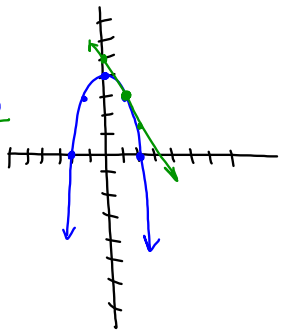
$-2x$

$(1,3) = -2(1) = -2$

$y-3 = -2(x-1)$

$(1,3)$

$f(x) = 4-x^2 \quad y = -2x+5$



Apr 2-10:22 AM

11.4: Limits at Infinity

Think about these numbers...What's the limit?

$\frac{5}{10} = .5$ $\Rightarrow \infty$

$\frac{5}{100} = .05$

$\frac{5}{1000} = .005$

$\frac{5}{100,000} = .00005$

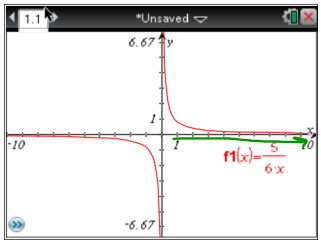
If we keep dividing 5 by a larger & larger number, the result is approaching ∞.

Therefore we say $\lim_{x\to\pm\infty} \frac{k}{x} = \frac{k}{\infty} \to 0$ where k is a constant.

Mar 7-8:19 AM

Evaluate $\lim_{x\to\infty} \frac{5}{6x}$

0



Geometrically, what are we looking at?

Mar 7-8:57 AM

$\lim_{x\to\infty} \frac{5x^3+2x^2}{7x^3-4} = \frac{5}{7}$

$\lim_{x\to-\infty} \frac{4x^2+2}{x} =$ DNE

Mar 15-10:19 AM

Indeterminate Form $\frac{"\infty"}{\infty}$ use Horizontal Asymptote Rules

(Given a polynomial in the numerator and denominator of a rational expression)

B.O.B.O: Bigger On Bottom limit = 0

B.O.T.N: Bigger On Top No limit exists (DNE)

E.A.T.S.D.C: Exponents Are The Same Divide Coefficients

A) $\lim_{x\to\infty} \frac{2-7x}{3+3x} = \frac{-7x+2}{3x+3} = -\frac{7}{3}$

B) $\lim_{x\to\infty} \left(7+\frac{2x^2}{(x+3)^2}\right)$ x^2+6x+9 $= 7+2 = 9$

C) $\lim_{x\to\infty} \frac{4x^3}{4x^2+5x}$ DNE

Mar 7-8:59 AM

A *sequence* is a list of numbers.

Sometimes a sequence follows a pattern (or rule) and approaches a certain value.

If the sequence approaches a certain value, we say the limit of the sequence converges.

Otherwise, we say the limit diverges (DNE).

Write the first 5 terms of the sequence, where n=1 represents the first term
Then find the limit, if it exists.

$a_n = \frac{4n-1}{n+3}$

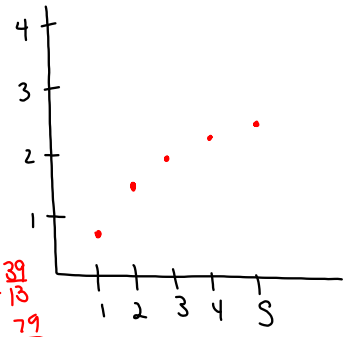
$a_1 = \frac{4(1)-1}{1+3} = \frac{3}{4}$

$a_2 = \frac{4(2)-1}{2+3} = \frac{7}{5}$

$a_3 = \frac{4(3)-1}{3+3} = \frac{11}{6}$

$a_4 = \frac{15}{7}$

$a_5 = \frac{19}{8}$



$a_{10} = \frac{39}{13}$

$a_{20} = \frac{79}{23}$

Mar 7-9:11 AM

Factorials (!) n!

$7! = 7\cdot6\cdot5\cdot4\cdot3\cdot2\cdot1$

5040

$x! = x\cdot(x-1)\cdot(x-2)\cdot(x-3)\cdot\ldots1$

$(x+2)! = (x+2)(x+1)(x)(x-1)(x-2)\cdot\ldots1$

$\lim_{x\to\infty} \frac{x!}{(x+2)!} = \frac{x(x-1)(x-2)(x-3)\ldots1}{(x+2)(x+1)(x)(x-1)(x-2)\ldots1}$

$\lim_{x\to\infty} \frac{1}{(x+2)(x+1)} = 0$

Mar 8-11:06 AM

HOMEWORK

...to infinity and beyond

11.4 (p817): 9-27 odd, 39-47 odd

Mar 15-10:09 AM