Calc AB

Lesson 14

8/13/15

Agenda: 8/13/15

- HW Leader :
- Lesson 14
  Limits of a function
- Work on PS 14

★ Quiz 1 tomorrow

Period 3
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Period 4
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T/F If $\lim_{x \to a^-} f(x) = \lim_{x \to a^+} f(x)$ then $\lim_{x \to a^+} f(x) = f(a)$

Limit of a Function :

Def - A function f has a Limit as x approaches a if

1. $\lim_{x \to a^+} f(x)$ and $\lim_{x \to a^-} f(x)$ exist
2. $\lim_{x \to a^+} f(x) = \lim_{x \to a^-} f(x)$.

★ If a function f is continuous at a then

$$\lim_{x \to a} f(x) = f(a)$$

Ex. $\lim_{x \to 3} \frac{x+6}{x^2+3} = \frac{9}{12} = \boxed{\frac{3}{4}}$

- These are easy cases what we care about is when the function isn't continuous at the value a.

Ex. 11.1 $\lim_{x \to 2} \frac{x^2-4}{x-2}$ Not continuous at $x=2$, not even defined.

$$= \lim_{x \to 2} \frac{(x-2)(x+2)}{x-2}$$

$$= \lim_{x \to 2} x+2 = \boxed{4}$$

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Ex. Evaluate $\lim_{x \to 5} \frac{x^2 + 5x}{x - 5}$

$= \lim_{x \to 5} \frac{x(x+5)}{x-5}$ ← approaches 50 / ← approaches 0

$= \boxed{\text{DNE}}$ Say the limit does not exist

Ex. 14.7 Evaluate $\lim_{x \to 0} \frac{(3+x)^2 - 3^2}{x}$

$= \lim_{x \to 0} \frac{9 + 6x + x^2 - 9}{x}$

$= \lim_{x \to 0} (6 + x)$

$= \boxed{6}$

- Simplify until the function is continuous at the value a or you can tell that it does not exist.

? Do not drop the limit on the left of your work until you evaluate the limit.

Another Definition for Continuous function:

f is continuous at a if

$\lim_{x \to a} f(x) = f(a)$ and $f(a)$ exists.