Calc AB

Lesson 70

12/2/15

Agenda: 12/1/15

lesson 70

Properties of Limits

~~★ Handout Calendar~~

Recall:

for f and g functions and c, a constants, the following are equal provided the limit(s) on the right exist:

1. $\lim_{x\to a} cf(x) = c \cdot \lim_{x\to a} f(x)$

2. $\lim_{x\to a} (f(x)+g(x)) = \lim_{x\to a} f(x) + \lim_{x\to a} g(x)$

3. $\lim_{x\to a} (f(x)\cdot g(x)) = \left(\lim_{x\to a} f(x)\right)\cdot\left(\lim_{x\to a} g(x)\right)$

4. $\lim_{x\to a} \frac{f(x)}{g(x)} = \frac{\lim_{x\to a} f(x)}{\lim_{x\to a} g(x)}$ if $\lim_{x\to a} g(x) \neq 0$.

5. Squeeze Theorem

If $f(x) \le g(x) \le h(x)$ for all x in (a,b) and for $c \in (a,b)$

$L = \lim_{x\to c} f(x) = \lim_{x\to c} h(x)$ exists then $\lim_{x\to c} g(x) = L$.

6. If $\lim_{x\to a} g(x) = L$ and $\lim_{x\to L} f(x) = f(L)$ then

$$\lim_{x\to a} f(g(x)) = f\left(\lim_{x\to a} g(x)\right) = f(L)$$

True or false:

- If $\lim_{x\to a} f(x) = L$ then $f(a)$ exists. F
- If $\lim_{x\to 3} f(x) = 5$ then $f(3) = 5$. F
- $\lim_{x\to \pi/4} \ln(\tan(x)) = 0$ T

  by #6
- If $-x^2 \le f(x) \le x^2$ then $\lim_{x\to 0} f(x) = 0$ T

  $\lim_{x\to 0} -x^2 = \lim_{x\to 0} x^2 = 0$
- " " then $\lim_{x\to 1} f(x) = \pm 1$ F

  $\lim_{x\to 1} -x^2 = -1$ $\lim_{x\to 1} x^2 = 1$
- $\lim_{x\to 0} \frac{|x|}{x} = 0$ since $\lim_{x\to 0} |x| = 0$ F

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