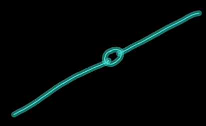
AP Calculus AB
Friday, September 13, 2013

Bellwork...Discuss last night's homework with someone, please.

Formative Assessment on Limits & Continuity



What needs to be in place in order for a limit to exist?

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

Find $k \ni \lim_{x\to 3} f(x)$ exists

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

When we plug in $x=3$, the denom $=0$.

$x^2-2x-3=(x-3)(x+1)$

We need to create a factor of $x-3$ in the numerator to cancel w/ the $x-3$ in the denominator. This will make $\lim_{x\to 3} f(x)$ exist.

$$2x^2+x+k=(2x+q)(x-3)$$

$-6x+qx=1x$

$-3q=k$

$q=7$

$k=-21$

$2x^2+x-21$ ✓

$(2x+7)(x-3)$

$$\lim_{x\to 3}\frac{2x^2+x-21}{x^2-2x-3}=\frac{2\cdot 3^2+3-21}{3^2-6-3}=\frac{0}{0}$$

$$\lim_{x\to 3}\frac{(2x+7)(x-3)}{(x+1)(x-3)}$$

$$\lim_{x\to 3}\frac{2x+7}{x+1}=\frac{2\cdot 3+7}{3+1}=\frac{13}{4}$$

21. Given two functions $f(x)$ and $h(x)$ such that $f(x) = x^3 - 3x^2 - 4x + 12$ and

$$h(x) = \begin{cases} \dfrac{f(x)}{x-3} & for \quad x \neq 3 \\ p & for \quad x = 3 \end{cases}$$

a. Find all zeros of the function f.

b. Find the value of p so that the function h is continuous at $x = 3$. Justify your ar

c. Using the value of p found in (b), determine whether h is an even function. Jus

$$\underbrace{x^3 - 3x^2}-4x+12 = 0$$

$$x^2(x-3) - 4(x-3) = 0$$

$$(x-3)(x^2-4) = 0$$

$$(x-3)(x-2)(x+2) = 0$$

$$x = 2, -2, 3$$

$$h(x) = \begin{cases} \dfrac{(x-3)(x-2)(x+2)}{x-3}, & x \neq 3 \\ p, & x = 3 \end{cases}$$

$$(3-2)(3+2) = 5$$

$$p = 5$$