Quiz 0, Math 111, Section 4 (Vinroot)   Name: Student # 1   17/20

(a): Compute the following limit (if it exists), making your steps clear: $\lim_{h\to 0} \frac{\frac{1}{3+h} - \frac{1}{3}}{h}$.

$$\lim_{h\to 0} \frac{\frac{1}{3+h} - \frac{1}{3}}{h} = \lim_{h\to 0} \frac{\frac{3-(3+h)}{3(3+h)}}{h} = \lim_{h\to 0} \frac{-\cancel{h}}{\cancel{h}\cdot 3(3+h)} = \lim_{h\to 0} \frac{-1}{3(3+h)} = \frac{-1}{3(3)} = \frac{-1}{6}$$

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You need these $\lim_{h\to 0}$ until you take the limit

Why can you cancel the h? Because $h \neq 0$ as $h \to 0$

(b): Compute the following limit if it exists, and if it does not exist but is infinite, describe the infinite limit and explain (factor the denominator):

$$\lim_{x\to 1^-} \frac{x-4}{x^2-3x+2}$$

$$\lim_{x\to 1^-} \frac{\overset{-3}{\underset{\frown}{1}}\; x-4}{\underbrace{(x-2)}_{-1}\underbrace{(x-1)}_{\text{negative since } x<1}} = -\infty$$

Yes

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This is good but I need a bit more. Tell me since $x \to 1^-$, $x-1 \to 0$ also, so $\frac{1}{x-1}$ gets very negative