Quiz 0, Math 111, Section 4 (Vinroot) Name: Student #2 14/20

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

$$= \lim_{h\to 0} \frac{\frac{3-(3+h)}{9+3h}}{h} = \lim_{h\to 0} \frac{-h}{9h+3h^2} = \lim_{h\to 0} \frac{-\cancel{h}}{\cancel{h}(9+3h)} = \lim_{h\to 0} \frac{-1}{9+3h}$$

since $h \neq 0$

$$= \frac{-1}{9+3(0)} = \frac{-1}{9} ✓$$

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Good.

Keep this factored as $3h(3+h)$ instead of multiplying it out, then you don't have to re-factor later.

(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):

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

$$\lim_{x\to 1^-} \frac{x-4}{(x-2)(x-1)} = \cancel{\infty}$$

$-\infty$

0

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See solutions, come to office hours with any questions!

This is a crucial point, but not enough. What are the signs of each factor, and how does the ~~sign~~ zero affect the size?

Explain more here.