Show all work, clearly and legibly, to receive full credit. Correct spelling, organization of your solution, and proper use of mathematical notation all count. You may use a stand-alone graphing calculator, but not any internet-based calculators. No notes, books, or other additional resources are permitted. Good luck!

1.) (4 pts.) Compute $f'(x)$ if $f(x) = 4 \sqrt{\ln x}$. Do not simplify your answer.

$$f'(x) = 4 \sqrt{\ln x} \cdot \ln 4 \cdot \frac{1}{2} (\ln x)^{-\frac{1}{2}} \cdot \frac{1}{x}$$

2.) (4 pts.) Evaluate the limit, showing how you do so:

$$\lim_{t \to \infty} \frac{2t + 3}{5 - 4t}$$

$$= \lim_{t \to \infty} \frac{\frac{2}{1} + \frac{3}{t}}{\frac{5}{t} - \frac{4}{t}}$$

$$= \frac{\frac{2}{1} + 0}{\frac{5}{t} - 0}$$

$$= \frac{2}{5}$$

3.) Graph or $L'Hopital's$ Rule

Since, as $t \to \infty$:

$$\frac{2t + 3}{5 - 4t} \to \infty$$

and

$$5 - 4t \to -\infty$$

then

$$\lim_{t \to \infty} \frac{2}{t - 4} = \frac{-1}{2}$$

3.) (2 pts.) Simplify $\log_4(1/16)$. Your answer should be a number and should not involve a logarithm.

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