Name: ___KEY___

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:

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

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

$= \lim_{t \to \infty} \frac{2 + \frac{3}{t}^{\to 0}}{\frac{5}{t}^{\to 0} - 4}$

$= \frac{2}{-4}$

$= \boxed{-\frac{1}{2}}$

2.) Ratio of coefficients

$\frac{2}{-4} = -\frac{1}{2}$

because the highest power of t, top and bottom, is the same.

3.) Graph or L'Hôpital's Ru[le]

↪ Since, as $t \to \infty$:

$2t+3 \to \infty$ and

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

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

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

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