

Name:

Quiz #3 - September 19, 2007

1. Find

$$\begin{aligned} & \lim_{x \rightarrow \infty} (\sqrt{9x^2 + x} - 3x). \\ &= \lim_{x \rightarrow \infty} \frac{(\sqrt{9x^2 + x} - 3x)(\sqrt{9x^2 + x} + 3x)}{\sqrt{9x^2 + x} + 3x} \\ &= \lim_{x \rightarrow \infty} \frac{x}{\sqrt{9x^2 + x} + 3x} = \lim_{x \rightarrow \infty} \frac{1}{\sqrt{9 + \frac{1}{x}} + 3} \\ & \quad \text{SINCE } x > 0 \text{ MEANS } x = \sqrt{x^2} \\ & \quad = \frac{1}{6} \end{aligned}$$

2. a. Define *precisely* what it means for the graph of $y = f(x)$ to have a *horizontal asymptote* $y = a$.
b. How many horizontal asymptotes can a function have?

a. IF $\lim_{x \rightarrow \infty} f(x) = a$ OR $\lim_{x \rightarrow -\infty} f(x) = a$. b. 2 at most

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