

**MATH101 - QUIZ 1**

Term 181

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**Give all details**

Let

$$f(x) = \begin{cases} \frac{x}{\sqrt{1+3x}-1} & \text{if } x > 0 \\ 0 & \text{if } x = 0 \\ \frac{(5-x)^2-25}{x^2} & \text{if } x < 0 \end{cases} .$$

1. Evaluate the limit

$$\lim_{x \rightarrow 0^+} f(x).$$

2. Evaluate the limit

$$\lim_{x \rightarrow 0^-} f(x).$$

3. Does  $f$  admit a vertical asymptote? Justify. If yes, find the equation.