

MATH 140 QUIZ #1 (SPRING 2021)

1 Evaluate $\lim_{x \rightarrow 3} \frac{x^2 - 2x - 3}{x - 3}$, or state it does not exist.

$$\lim_{x \rightarrow 3} \frac{x^2 - 2x - 3}{x - 3} = \lim_{x \rightarrow 3} \frac{(x - 3)(x + 1)}{x - 3} = \lim_{x \rightarrow 3} (x + 1) = 4.$$

2 Evaluate $\lim_{x \rightarrow 2} \left(\frac{1}{x - 2} - \frac{2}{x^2 - 2x} \right)$, or state it does not exist.

$$\lim_{x \rightarrow 2} \left(\frac{1}{x - 2} - \frac{2}{x^2 - 2x} \right) = \lim_{x \rightarrow 2} \frac{x - 2}{x^2 - 2x} = \lim_{x \rightarrow 2} \frac{1}{x} = \frac{1}{2}.$$

3 Evaluate $\lim_{x \rightarrow 0} \frac{x}{\sqrt{cx + 1} - 1}$, where $c \neq 0$.

$$\lim_{x \rightarrow 0} \frac{x}{\sqrt{cx + 1} - 1} = \lim_{x \rightarrow 0} \left(\frac{x}{\sqrt{cx + 1} - 1} \cdot \frac{\sqrt{cx + 1} + 1}{\sqrt{cx + 1} + 1} \right) = \lim_{x \rightarrow 0} \frac{\sqrt{cx + 1} + 1}{c} = \frac{2}{c}.$$