

Math 131 - Quiz 3

September 3, 2025

Name key

Score _____

Show all work to receive credit. Supply explanations where necessary. Partial credit may be awarded on multiple choice problems for correct work or explanations.

1. (3 points) Determine the limit analytically: $\lim_{x \rightarrow 0} \frac{(x-2)^2 - 4}{x}$ % More work

$$\begin{aligned} (x-2)^2 &= x^2 - 4x + 4 \\ \lim_{x \rightarrow 0} \frac{x^2 - 4x + 4 - 4}{x} &= \lim_{x \rightarrow 0} \frac{x^2 - 4x}{x} = \lim_{x \rightarrow 0} \frac{x(x-4)}{x} \\ &= \lim_{x \rightarrow 0} (x-4) = \boxed{-4} \end{aligned}$$

2. (3 points) Determine the limit analytically: $\lim_{t \rightarrow 16} \left(\frac{4 - \sqrt{t}}{32 - 2t} \right)$ % More work

$$\begin{aligned} \lim_{t \rightarrow 16} \frac{4 - \sqrt{t}}{2(16 - t)} \cdot \frac{4 + \sqrt{t}}{4 + \sqrt{t}} &= \lim_{t \rightarrow 16} \frac{16 - t}{2(16 - t)(4 + \sqrt{t})} \\ &= \lim_{t \rightarrow 16} \frac{1}{2(4 + \sqrt{t})} = \frac{1}{2(4 + \sqrt{16})} = \boxed{\frac{1}{16}} \end{aligned}$$

3. (3 points) Determine the limit analytically: $\lim_{x \rightarrow -1} \frac{x^2 + 3x + 2}{2x^2 + 2x}$ % More work

$$\lim_{x \rightarrow -1} \frac{(x+1)(x+2)}{2x(x+1)} = \lim_{x \rightarrow -1} \frac{x+2}{2x} = \frac{-1}{-2} = \boxed{-\frac{1}{2}}$$

4. (1 point) Determine the limit analytically: $\lim_{z \rightarrow 3} \frac{(z-4)^2 + 2(z+1)}{z+3}$ $\frac{45}{0}$

THE $\frac{45}{0}$ FORM INDICATES
THAT THE LIMIT DNE
BECAUSE OF UNBOUNDED GROWTH.