

MATH1003
QUIZ 1

This quiz has four questions, with each question worth 5 marks.

The quiz lasts for thirty minutes. No calculator, textbooks, or other notes are allowed.

1. Find $\lim_{t \rightarrow 0} \frac{\sqrt{t^2 + 9} - 3}{t^2}$.
2. Use the Squeeze Theorem to show that $\lim_{x \rightarrow 0^+} \sqrt{x} e^{\sin \frac{\pi}{x}} = 0$.
3. Let:

$$f(x) = \begin{cases} x, & \text{when } x < 1; \\ 3, & \text{when } x = 1; \\ 2 - x^2, & \text{when } x > 1. \end{cases}$$

Find the following limits, if they exist:

- (i) $\lim_{x \rightarrow 1^-} f(x)$,
- (ii) $\lim_{x \rightarrow 1} f(x)$,
- (iii) $\lim_{x \rightarrow 3} f(x)$.

Sketch the graph of $y = f(x)$.

4. When is $y = 2\sqrt{3 - x}$ continuous? Explain your answer.