MATA 31 Calculus 1 winter 2024

Problem Set 1

Jan 28 - Feb 4 on Crowdmark

Each question is 25 points.

1. (25) Let $f(x) = x^2 - x - 12$. Use $\epsilon - \delta$ definition to prove that $f(x)$ is continuous at $x = 3$.

2. (25) Write the precise statements of

   (a) (10) Extreme Value Theorem

   (b) (10) Intermediate Value Theorem

   (c) (5) Use (b) to prove that the real number $\sqrt{2}$ exists. Hint: Consider $f(x) = x^2$

3. (25) Find the limits or write DNE if the limit does not exists. No proof is required.

   (a) (10)

$$\lim \frac{\sin x}{}$$