

1. Determine if the function $f(x) = \begin{cases} x^3 - 3x^2 + 4 & \text{if } x > 1 \\ 2\sin\left(\frac{\pi}{2}x\right) & \text{if } x \leq 1 \end{cases}$ is continuous at $a = 1$.

2. Use the intermediate value theorem to show that $x^2 - \cos x = 0$ has a solution on $(0, \frac{\pi}{2})$.