

1. Find each of the following limits:

a. $\lim_{x \rightarrow 1} \frac{x-1}{x^{\frac{1}{6}}-1}$

b. $\lim_{x \rightarrow 0} \frac{x}{\sqrt[3]{x+8}-2}$

c. $\lim_{x \rightarrow 0} \frac{2x^2}{\sqrt[3]{(x+27)^2}-6\sqrt[3]{x+27}+9}$

2. Verify the Intermediate Value Theorem for $f(x) = x^2 - 3x - 1$ on the interval $[1,3]$.

3. Determine A such that the given function is continuous at $x = 1$.

$$f(x) = \begin{cases} \frac{x^3 - 3x^2 + 2}{x^2 - 1}, & x \neq 1 \\ Ax + 5, & x = 1 \end{cases}$$