

1. Let $f(x) = x^3 - 3x^2 + x + 1$

(a) Show that there is a point between $x = -2$ and $x = 1$ where $f(x) = -10$

(b) Show that $f(x)$ has a root between $x = 2$ and $x = 4$

(c) Approximate the value of the root in (b) accurate to within 0.1 of its exact value

2. If $g'(x) = x \sin(x^2) + 1$, show that $g(x)$ has a local maximum between $x = 1$ and $x = 2$. *Hint: Use the IVT!*

3. Find the following limits:

(a) $\lim_{x \rightarrow \infty} \frac{5}{x+2}$

(b) $\lim_{x \rightarrow \infty} \frac{5x}{2x+2}$

(c) $\lim_{x \rightarrow \infty} \frac{5x^2 + 3}{2x^2 + x + 2}$