Problem 1

Let

\[ f(x) = \frac{\sqrt{\pi x^4 + 10x} - \sqrt{3x^4 + 1}}{x + 2} \]

Compute

\[ \lim_{x \to \infty} f(x) \quad \text{and} \quad \lim_{x \to -\infty} f(x) \]

Problem 2

A fiber bord shipping crate with a square base and top is constructed with double thickness on the bottom for strength. If the volume of the crate is 96 ft\(^3\), find the dimensions that maximize the needed material.