

Quiz
September 19, 2007

Problem 1. Find the limit $\lim_{x \rightarrow \infty} \frac{2x^3 - x - 3}{3x^3 + x^2 - 3}$.

Problem 2. Determine all points at which the following function is discontinuous. For each of these points determine whether it is a jump, a removable discontinuity or neither.

$$f(x) = \begin{cases} \cos x, & \text{if } x < 0, \\ 0, & \text{if } x = 0, \\ \frac{\sin x}{x}, & \text{if } 0 < x < \pi, \\ x^2, & \text{if } \pi \leq x. \end{cases}$$

Problem 3. Show that there exists a real number x for which $\cos x + x^2 = 10$.