1. Find the following limits.

   (a) $\lim_{x\to 3} \frac{1}{x-3}$

   (b) $\lim_{x\to 0} \frac{x^3-4x}{2x+1}$

   (c) $\lim_{x\to 3} \frac{\frac{1}{x}-\frac{1}{3}}{x-3}$

   (d) $\lim_{x\to -2} \frac{1}{x^2-4}$

   (e) $\lim_{x\to 4} \frac{x^2-7x+12}{2x-8}$

2. Find $\lim_{x\to 0^-} x^3\cos(\frac{2}{x})$. (Hint: Squeeze theorem.)

3. Determine where the following function is continuous, and state why.

$$f(x) = \frac{1}{\sqrt{x+3}} - \frac{x^2-1}{x-1} - 4x^2$$

4. Is the following function continuous at $x = 0$? $f(x) = \begin{cases} \frac{x-6}{x-3} & x < 0 \\ 2 & 0 \leq x = 0 \\ \sqrt{4 + x^2} & x > 0 \end{cases}$

5. Use the precise definition of a limit (ϵ and δ) to prove the following limit.

$$\lim_{x \to 3}(3x + 5) = 35$$

6. Find where the following function is discontinuous, and state the types of discontinuities.

$$f(x) = \frac{x^2 - 3x + 2}{x^2 - x - 6}$$

7. Use the Intermediate Value Theorem to show that $h(x) = 4x^2 - 29x^2 + 25$ has a real root in the inverval $(-3, -2)$.