Kuwait University Math. 101 Date : March 22nd, 2001
Dept.of.Maths.&Comp. Sci. First Exam. Duration : 75 minutes.

Calculators, Mobile Telephones and Pagers are not allowed.
Answer all the following questions. Show your work.

1. Find each of the following limits, if it exists:

a) $\lim_{x\to 4} \dfrac{\sqrt{x}-2}{x-4}$ (3 pts.)

b) $\lim_{x\to 0} |x| \cos\dfrac{\pi}{x}$ (3 pts.)

c) $\lim_{x\to -\infty} \dfrac{x+2\sqrt{x^2+1}}{x+1}$ (3 pts.)

2. Find the vertical and horizontal asymptotes, if any, of the graph of the function

$$f(x) = \frac{x+\sqrt[3]{x}}{|x-1|}.$$ (4 pts.)

3. Let

$$f(x) = \begin{cases} \dfrac{x^3-a^3}{|x-a|}+b & , \text{ if } x \neq a \\ a^2+2b-1 & , \text{ if } x = a. \end{cases}$$

Find all values of a and b so that f is continuous at $x=a$. (4 pts.)

4. Find and classify the points of discontinuity of

$$f(x) = \frac{x^4+8x}{|x|(x^2-4)}.$$ (4 pts.)

5. a) State the Intermediate Value Theorem. (1 pt.)

b) Let $f(x) = 3x^5+2x^4+x-4$. Show that there is a real number c such that $f(c)=10$. (3 pts.)