SATPREP
Assignment: Continuity

1. (a) If f(x) = 2x +1, when xÅ 1 and f(x)=3 when x = 1, show that the function f (x) continuous at x =1.

(b) If f(x) $= \begin{cases} 4x+3, & x \neq 2 \\ 3x+5, & x = 2 \end{cases}$, find whether the function f is continuous at x = 2.

(c) Determine whether f (x) is continuous at x = 2, where

$$f(x) = \begin{cases} 4x+3, & x \leq 2 \\ 8-x, & x > 2 \end{cases}$$

(d) Determine the values of k so that the function

$$f(x) = \begin{cases} kx^2, & x \leq 2 \\ 3, & x > 2 \end{cases} \text{ is continuous at } x = 2.$$

2. Examine the continuity of the following functions :

(a) f(x) $= \begin{cases} \dfrac{|x-2|}{x-2}, & x \neq 2 \\ 1, & x = 2 \end{cases}$ at x = 2

(b) f(x) $= \begin{cases} \dfrac{\sin 7x}{x}, & x \neq 0 \\ 7, & x = 0 \end{cases}$, at x = 0

(c) For what value of a is the function

f(x)$= \begin{cases} \dfrac{\sin 5x}{3x}, & x \neq 0 \\ a, & x = 0 \end{cases}$, continuous at x = 0 ?

3. (a) Show that the function f (x) is continuous at x = 2, where

$$f(x) = \begin{cases} \dfrac{x^2 - x - 2}{x-2}, & x \neq 2 \\ 3, & x = 2 \end{cases}$$

(b) For what value of k is the following function continuous at x = 1?

f(x) $\begin{cases} \dfrac{x^2 - 1}{x-1}, & x \neq 1 \\ k, & x = 1 \end{cases}$

4 (a) If $f(x) = \begin{cases} \dfrac{|x|}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$ find whether f is continuous at x = 0

(b) Test the continuity of the function f (x) at the origin.

$$f(x) = \begin{cases} \dfrac{x}{|x|}, & x \neq 0 \\ 1, & x = 0 \end{cases}$$

5 At what points is the function f (x) continuous in each of the following cases ?

(a) $f(x) = \dfrac{x^2 + 2x + 5}{x^2 - 8x + 16}$

(b) $f(x) = \dfrac{x - 3}{x^2 + 5x - 6}$