King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

Math 101 (Term 162) - Quiz 2

Student Name_____ **Student ID:** _____

Exercise 1 **[5 points]**

Let $f(x) = \begin{cases} \frac{x^2-1}{x-1} & ; \ x < 1 \\ ax^2 - bx & ; \ 1 \leq x < 2 \\ ax - b & ; \ x \geq 2 \end{cases}$

Find the values of a and b that makes f continuous everywhere.

Exercise 2 **[3 points]**

Let $f(x) = \frac{x-4}{\sqrt{9x^2+2x+1}}$. Find the horizontal asymptotes of f.

Exercise 3 **[2 points]**

Below, each limit represents the derivative of some function f at some number a. State such f and a in each case:

(a) $\lim_{h\to 0} \frac{\sqrt[4]{81+h}-3}{h}$ Then, $a =$ $f(x) =$

(b) $\lim_{t\to 1} \frac{t^4+2t-3}{t-1}$ Then, $a =$ $f(x) =$