King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
Math 101 Section 03 Quiz II (Term 142)

Name : ..... **ID** #..... Serial #: .....

1. If the function

$$f(x) = \begin{cases} ax + 3 & \text{if } x \geq -1 \\ bx^2 - ax & \text{if } x < -1 \end{cases}$$

is differentiable on $(-\infty, \infty)$, then find the values of a and b.

2. Find the equation of the tangent line to the curve $y = x^3 - x^2$ at $x = -1$.

3. At time $t > 0$, the position of a particle moving along the s-axis is $s(t) = t^3 - 6t^2$. Find the acceleration of the particle when the velocity is zero.

4. If $f(x) = x^2 e^x$, then find $\lim_{h \to 0} \dfrac{f(x+h) - f(x)}{h}$

5. If $y = \dfrac{x}{2 - \sqrt{x}}$, then find $\dfrac{dy}{dx}$ at $x = 9$.