Quiz 2 **Sec: 17**

Name: **ID#:** **Sr. No.**

1. Let $y = f(x) = 2x^2 - 3x + 5$

a. Find the average rate of change of y with respect to x over the interval $[0, 5]$.

b. Using limits, find $f'(x)$.

c. Find the instantaneous rate of change of y with respect to x at $x = \pi$.

d. Find an equation to the line that is tangent to the curve $f(x)$ at the point $P(2, 7)$.

2. Use the limits to find all horizontal asymptotes to the curve of the function:

$f(x) = \sqrt{4x^2 + 2x} - \sqrt{4x^2 + 5x}$

3. For the following function, Use the Intermediate Value Theorem (IVT) to show that the equation *f(x)* +1 has a root between 1 and 2.

$$f(x) = \frac{\sqrt{8x^3 + 27}}{|x - 2|^3 - 8}$$

4. $Let\ f(x) = \begin{cases} \dfrac{(x-1)(x+3)}{(x-1)^n}, & x > 1 \\ x^2 + 3, & x \leq 1 \end{cases}$

Where n is a nonnegative integer ($n \geq 0$).

a. Use limits to find the value(s) of n for which the function is continuous at every x.
b. Use limits to find the value(s) of n for which the function has infinite discontinuity at $x = 1$.