ID #_____ Name _____ Quiz 6 *MATH 101 Section: ____ Sr #____

[Q.2, 3: See Other side of the Paper]

Q1 Suppose $f(x) = x(1+x)^2$. Do the following:

(i) Find the **critical number(s)** of ***f*** and the **intervals** where ***f*** is **increasing** or **decreasing**.

(ii) Find the **local maxima/minima** of ***f*** using the **1st Derivative Test**.

(iii) Find the **point(s) of inflection** and the **intervals** where is **Concave Upward or Downward.**

(iv) Apply **2nd Derivative Test** to check if ***f*** has **local maxima/minima** at the **critical number(s)**

Q2 Evaluate: $\lim_{x\to 1^-} \frac{(x-1)^2}{\cos \pi(x-\frac{1}{2})}$.

Q3. Bonus Question (3 Pts)

We know that $f(x)=\cos^2 x-1$ satisfies the **Hypothesis** of the **Rolle's Theorem** in the interval $[0,\pi]$. Find the **point(s)** which satisfy the Conclusion of the **Rolle's Theorem**

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[Q.2, 3: See Other side of the Paper]

Q1 Suppose $f(x) = x + 2 + \cos^2 x, \quad x \in [0, \pi]$. Do the following:

(i) Find the **critical number(s)** of ***f*** and the **intervals** where ***f*** is **increasing** or **decreasing**.

(ii) Find the **local maxima/minima** of ***f*** using the **1st Derivative Test**.

(iii) Find the **point(s) of inflection** and the **intervals** where is **Concave Upward or Downward.**

(iv) Apply **2nd Derivative Test** to check if ***f*** has **local maxima/minima** at the **critical number(s).**

Q2 Evaluate: $\lim_{x\to 1^-}(x-1)^2 e^{1/(x-1)^2}$.

Q3. Bonus Question (3 Pts)
We know that $f(x)=x(x^2-1)$ satisfies the **Hypothesis** of the **Rolle's Theorem** in the interval $[-1,0]$.
Find the **point(s)** which satisfy the Conclusion of the **Rolle's Theorem**