Math101		Name:
Quiz# 3 & 4	**AAAA**	Serial No:

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1- If $f(x) = cos(\sqrt{2}\,x)$, find $f^{(82)}(\frac{\pi}{\sqrt{2}})$?

2- Let $f(x) = \begin{cases} x^2, & x \leq 2 \\ mx + b, & x > 2 \end{cases}$ Find the values of m and b that make f differentiable everywhere.

3- Find the derivative of $y = \pi^x \; x^\pi$

4- A particle moves on a vertical line so that its coordinate at time is

$$y = t^3 - 12t + 3,\ t \geq 0$$

(a) When is the particle moving downward?

(b) Find the distance that the particle travels in the time interval $0 \leq t \leq 3$.

(c) When is the particle speeding up?

5- if $g(x) = \dfrac{x^2}{f(\sqrt{x})}$, $f(2) = 1$, and $f'(2) = -1$, then find $g'(4)$

6- Find an equation of normal line to the curve $4y^2 + \sqrt{-x + \sqrt{x} + 1} = 5$ at the point $(1, -1)$.

7- If $\ln(x + y) = \tan^{-1}(xy)$, find $\left.\frac{dy}{dx}\right|_{x=0}$?

8- If $y = \sec^{-1}[\ln(x^2 + e^{x^2})]$ then $\left.\frac{dy}{dx}\right|_{x=e}$?

9- Find all points on the graph of the function $f(x) = \tan^{-1}(x^3 - 3x^2 + 1)$ at which the tangent line is horizontal.

10- If $y = (\ln x)^{\ln x}$, find $\left.\frac{dy}{dx}\right|_{x=e}$?