Kuwait University
Department of Mathematics & Computer Science.

Math.101
(Incomplete)
Second Exam.

Date December 18, 1995.
Duration : 75 minutes.

Calculators are not allowed

Answer the following questions:

1. (.6 points)Find y' if

$$y = \sin^2\left(\cos\left(\sqrt[3]{\pi x}\right)\right)$$

2. (6 points)Use the differentials to find an approximate value of $\sqrt[3]{63.9} - 1$.

3. (6 points)Find an equation for the normal line to the graph of

$$\sqrt{1+xy} + \tan(xy) = 1$$

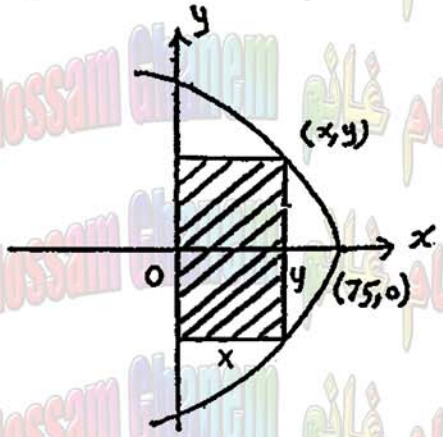
at the point whose *x-coordinate* is 0.

4. (6 points)The volume V of a sphere changes with time according to the equation

Find the rate of change of the surface area of the sphere, when $t = 1$ *sec.*

5. (6 points)Find the dimensions of the rectangle of maximum area that can be inscribed in the curve (*see figure*)

$$x = 75 - y^2.$$



6. Let

$$f(x) = x^3 - 2x^2 + x.$$

(a) (4 points)Find the intervals on which f is increasing or is decreasing, and find the local extrema of f (if any).

(b) (4 points)Find the intervals on which the graph of f is concave upward or concave downward, and find the points of inflection (if any).

(c) (2 points)Sketch the graph of f.