Dawson College: Calculus 1: 201-NYA-05-C2: Winter 2008: Saturday. April 26th

Name: SOLUTIONS
Student ID: _____

Quiz 9

This quiz is graded out of 10 marks. No books or notes are allowed. SHOW ALL YOUR WORK. If you need more space for your answer use the back of the page.

Question 1. *(10 marks)*
Find two positive numbers such that the sum of the first number squared and the second number is 27 and the product of the two numbers is a maximum.

Let x & y be the 2 numbers

$$x^2 + y = 27$$

$P = xy$ to be MAXimized

$$y = 27 - x^2$$

$$P = x(27 - x^2)$$

$$P = 27x - x^3$$

$$P' = 27 - 3x^2 \qquad P' = 0 \Rightarrow \quad 27 = 3x^2$$

$$x^2 = 9$$

$$x = \pm 3$$

since the Numbers Must be positive
$x = 3$ is the only possible MAX

CHECK $P'' = -6x$ $P''(3) < 0$ so $x = 3$ IS A MAX

$$y = 27 - x^2 = 27 - 3^2 = 18$$

so $\boxed{x = 3 \quad \& \quad y = 18}$