Dawson College: **Calculus 1**: 201-NYA-05-C2: Winter 2008: Thurs. April 24th

Name: _____

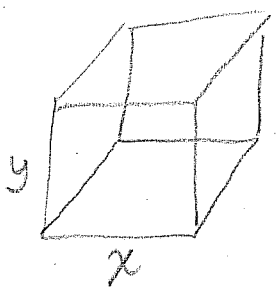
Student ID: SOLUTIONS

Quiz 11

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)*

A rectangular storage container with a square base and an open top is to be constructed. It must have a total volume of $4m^3$. Find the dimensions of the container if the total surface area of the storage container is to be a minimum.



$V = x^2 y$

$4 = x^2 y \Rightarrow y = 4/x^2$

$A = x^2 + 4xy$

$A = x^2 + 4x\left(\frac{4}{x^2}\right)$

$A = x^2 + \frac{16}{x}$

$A' = 2x - \frac{16}{x^2} \Rightarrow 2x = \frac{16}{x^2}$

$x^3 = 8$

$x = 2$

$A'' = 2 + 16/x^3$ $\quad A''(2) = 4 > 0$ so $x = 2$ is a Min

$x = 2 \quad y = 4/x^2 = 4/4 = 1$

THE BOX IS $2M \times 2M \times 1M$.