

MATH 105 – Written Homework #5

For this assignment, you are expected to provide full solutions with complete justifications. You will be graded on the mathematical, logical and grammatical coherence of your solutions. You are encouraged to work together, but your solutions must be written **independently**. Please write your name and student number at the top of the first page. If your solutions are on multiple pages, the pages must be stapled together. This assignment is due at **1:00pm on Friday, August 11**. Late assignments will not be accepted.

1. Suppose you have a parallelogram whose sides are all of equal length. Use vector methods to show that the diagonals are perpendicular.

2. Let

$$f(x, y) = \int_{x^2}^y e^{-t^2} dt,$$

and let P be the point on the graph of $f(x, y)$ with x -coordinate equal to -1 and y -coordinate equal to 1 . Find the equation of the plane tangent to the graph of $f(x, y)$ at P .

3. **[Bonus]** Find the dimensions of the box with volume 1000cm^3 that has minimal surface area.