

Math 20E - Lecture A00
Fall 2016
Midterm #1, VERSION A
10/21/2016
Time Limit: 50 Minutes

Name: _____

PID: _____

Section Time: _____

This exam contains 1 pages (including this cover page) and 4 questions.
Total of points is 100.

You may not use any notes (except your cheat sheet) or calculators during this exam.

Write your *Name*, *PID*, and *Section* on the front of your Blue Book.

Write the *Version* of your exam on the front of your Blue Book.

Write your solutions clearly in your Blue Book.

Read each question carefully, and answer each question completely.

Show all of your work; no credit will be given for unsupported answers.

1. (25 points) Let $f(x, y) = e^{x^2+y}$.
 - a. (15 points) Find the tangent plane to the surface given by the graph of the function $z = f(x, y)$ at the point $(0, 0, 1)$.
 - b. (10 points) Determine the second order Taylor polynomial of the function at this point.
2. (25 points) Let $f(u, v) = (\cos u, v + \sin u)$ and $g(x, y, z) = (x^2 + \pi y^2, xz)$.
 - a. (10 points) Compute $Dg(x, y, z)$ for any given point $(x, y, z) \in \mathbb{R}^3$.
 - b. (15 points) Compute $D(f \circ g)(0, 1, 1)$.
3. (25 points) Change the order and evaluate

$$\int_0^1 \int_{\sqrt{y}}^1 (x^2 + y^3) dx dy.$$

Be sure to clearly sketch the region of integration and indicate how you found the new limits of integration.

4. (25 points) Let $D^* = \{(u, v) : 0 \leq u \leq 1, 0 \leq v \leq 1\}$ and let D be the image of D^* under the transformation $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ given by $T(u, v) = (u^2v, uv^2)$. Calculate the area of D .