

MATH 2400: Calculus III

July 18, 2008

Exam 3

I have neither given nor received aid on this exam.

Name: _____

Box your answers.

In order to receive full credit your answer must be **complete**, **legible** and **correct**. Show all of your work, and give adequate explanations.

No calculators, no books, no notes are allowed on this exam.

DO NOT WRITE IN THIS BOX!

Problem	Points	Score
1	15 pts	
2	15 pts	
3	20 pts	
4	20 pts	
5	30 pts	
6 - EC	10 pts	
TOTAL	100 pts	

1. Evaluate the following integrals:

$$(a) \int_{-2}^4 \int_0^3 \int_1^2 xz^2 dy dz dx =$$

$$(b) \int_0^{16} \int_{\sqrt{y}}^4 e^{x^3} dx dy =$$

$$(c) \int_{-2}^2 \int_0^{\sqrt{4-x^2}} \int_0^{\sqrt{4-x^2-y^2}} \sqrt{x^2 + y^2 + z^2} dz dy dx =$$

2. Find the volume of the solid that is in the first octant, and bounded above by the plane $x + 2y + 3z = 6$.

3. Find the surface area of the surface defined by $\mathbf{r}(u, v) = \langle u \cos v, u^2, u \sin v \rangle$, $0 \leq u \leq \sqrt{2}$, $0 \leq v \leq 2\pi$.

4. Find the center of gravity of the hemispherical solid bounded by $z = \sqrt{a^2 - x^2 - y^2}$, $z = 0$ and has density at each point proportional to the distance from the origin.

5. Using the transformation $u = x - y, v = x + y$, evaluate $\iint_R \frac{x - y}{x + y} dA$ where R is the square with corners at $(0, 2), (1, 1), (2, 2), (1, 3)$.

6. Three identical cylinders with radii R intersect at the same point at right angles. Find the volume of their intersection.