

Midterm Exam 2, Monday, Nov 8, 2004

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DO NOT OPEN THE EXAM BEFORE THE BELL !

Please write your name and your TA's name below.

Name:

TA:

Each problem is worth 20 points, for a total of 100 points. **Calculators are not allowed on this test.** Please read each question carefully, it also helps to check afterwards that you have answered each part of each question. **You must show all your work to receive credit.** When you turn in your paper after the test, make sure the TA checks your name in their list or writes your name down. Good luck!

1	2	3	4	5	Total

[1] The region R is a triangle with vertices $(0, 0)$, $(3, 1)$ and $(3, 3)$. Write the integral of a function $f(x, y)$ over R as a repeated integral

(a) in the order $dx dy$

(b) in the order $dy dx$.

Each part is worth 10 points. You may need to split your integral into two integrals for one or both parts of the problem.

[1] (20 pts)

Please leave blank!

[2] A function $f(x, y)$ is given by

$$f(x, y) = \begin{cases} x^2 + y^2, & \text{if } x^2 + y^2 \leq 3 \\ 3, & \text{if } x^2 + y^2 > 3. \end{cases}$$

Find

$$\int_{y=-2}^2 \int_{x=-3}^0 f(x, y) \, dx \, dy.$$

[2] (20 pts)

Please leave blank!

[3] Find the surface area of the graph of the function f which is defined on the square with vertices $(1, 1)$, $(1, 2)$, $(2, 2)$ and $(2, 1)$ by $f(x, y) = \sqrt{2xy}$.

[3] (20 pts)

Please leave blank!

[4] Set up the triple integral of $f(x, y, z)$ over the tetrahedron with vertices $(0, 0, 0)$, $(2, 1, 0)$, $(0, 5, 0)$, and $(0, 0, 3)$ as a repeated integral in the order $dzdydx$.

[4] (20 pts)

Please leave blank!

[5] The solid S is cut out from the ball $x^2 + y^2 + z^2 \leq 1$ by the half-cone $z = \sqrt{x^2 + y^2}$. Find the volume of S **using integration in spherical coordinates**.

If you calculate the volume of S without using spherical coordinates, you can get partial credit up to 10 points.

[5] (20 pts)

Please leave blank!