

Name _____ ID _____

MATH 253

Quiz 5

Spring 2007

Sections 501-503

P. Yasskin

1-3	/15
4	/10
Total	/25

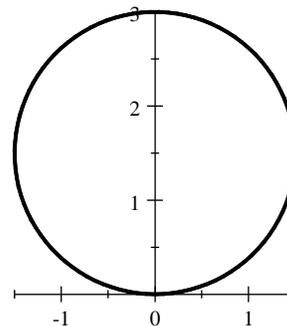
Multiple Choice: (5 points each)

1. Find the volume of the solid below the paraboloid $z = 9 - x^2 - y^2$ above the xy -plane.

- a. $\frac{3}{2}\pi$
- b. 3π
- c. $\frac{9}{2}\pi$
- d. $\frac{27}{2}\pi$
- e. $\frac{81}{2}\pi$

2. Find the center of mass of the circle $r = 3 \sin \theta$ if the mass surface density is $\rho = y$.

- a. $(0, \frac{8}{15})$
- b. $(0, \frac{15}{8})$
- c. $(0, \frac{9}{4})$
- d. $(0, \frac{4}{9})$
- e. $(0, \frac{405}{64}\pi)$



HINTS: $\int_0^\pi \sin^4 \theta d\theta = \int_0^\pi \cos^4 \theta d\theta = \frac{3}{8}\pi$ $\int_0^{2\pi} \sin^4 \theta d\theta = \int_0^{2\pi} \cos^4 \theta d\theta = \frac{3}{4}\pi$

$\int_0^\pi \sin^6 \theta d\theta = \int_0^\pi \cos^6 \theta d\theta = \frac{5}{16}\pi$ $\int_0^{2\pi} \sin^6 \theta d\theta = \int_0^{2\pi} \cos^6 \theta d\theta = \frac{5}{8}\pi$

3. Compute $\int_0^2 \int_0^{\sqrt{4-x^2}} e^{x^2+y^2} dy dx$

a. $\frac{\pi}{2}(e^4 - 1)$

b. $\frac{\pi}{2}e^4$

c. $\frac{\pi}{4}(e^4 - 1)$

d. $\frac{\pi}{4}e^4$

e. $\frac{\pi}{2}e^3$

4. Compute $\iint_R y^2 dx dy$ over the diamond shaped region R bounded by

$$y = \frac{1}{x}, \quad y = \frac{6}{x}, \quad y = x, \quad y = 2x$$

FULL CREDIT for integrating in the curvilinear coordinates (u, v) where $u^2 = xy$ and $v^2 = \frac{y}{x}$.
(Solve for x and y .)

HALF CREDIT for integrating in rectangular coordinates.

