Name_____ ID_____

1-3	/15
4	/10
Total	/25

MATH 251 Quiz 5 Spring 2007

Sections 509 P. Yasskin

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

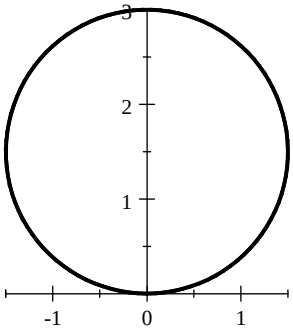
b. 3π

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. $\left(0, \frac{8}{15}\right)$

b. $\left(0, \frac{15}{8}\right)$

c. $\left(0, \frac{9}{4}\right)$

d. $\left(0, \frac{4}{9}\right)$

e. $\left(0, \frac{405}{64}\pi\right)$

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

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

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.