

Name _____ Sec _____

MATH 253 Exam 2 Fall 2009

Section 501,503 P. Yasskin

Multiple Choice: (5 points each. No part credit.)

1-12	/60	15	/15
13	/15	16	/5
14	/10	Total	/105

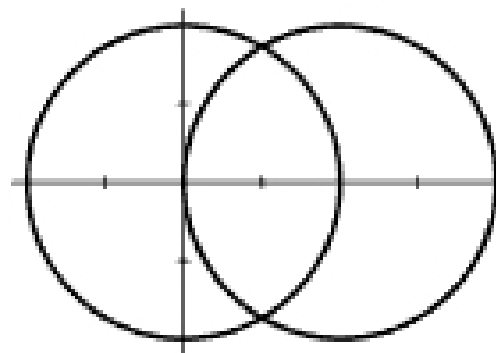
1. Compute $\int_0^2 \int_{-x}^x 3y^2 \, dy \, dx$.

- a. 8
- b. 12
- c. 16
- d. 24
- e. 0

2. Compute $\int_0^9 \int_{\sqrt{y}}^3 \pi \sin(\pi x^3) \, dx \, dy$. HINT: Reverse the order of integration.

- a. $\frac{1}{9}$
- b. $\frac{2\pi}{9}$
- c. $\frac{1}{3}$
- d. $\frac{2}{3}$
- e. $\frac{2\pi}{3}$

3. Find the area inside the circle $r = 2 \cos \theta$ but outside the circle $r = 1$.



- a. $\frac{\pi}{3} - \cos \frac{\pi}{3}$
b. $\frac{2\pi}{3} + \cos \frac{2\pi}{3}$
c. $\frac{\pi}{3} + \sin \frac{2\pi}{3}$
d. $\frac{2\pi}{3} - \sin \frac{\pi}{3}$
e. $\frac{2\pi}{3} + \sin \frac{\pi}{3}$

4. Compute $\int_0^2 \int_0^{\sqrt{4-x^2}} e^{x^2+y^2} dy dx$. HINT: Switch to polar coordinates.

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

5. Compute the mass of the solid cone $\sqrt{x^2 + y^2} \leq z \leq 4$ if the volume density is $\rho = z$.

- a. 4π
- b. 8π
- c. 16π
- d. 32π
- e. 64π

6. Compute the center of mass of the solid cone $\sqrt{x^2 + y^2} \leq z \leq 4$ if the volume density is $\rho = z$.

- a. $(0, 0, \frac{5}{16})$
- b. $(0, 0, \frac{16}{5})$
- c. $(0, 0, \frac{1024\pi}{5})$
- d. $(0, 0, \frac{5}{1024\pi})$
- e. $(0, 0, \frac{8}{5})$

7. Find the average value of the function $f = \frac{1}{x^2 + y^2 + z^2}$ over the solid region between the two

spheres $x^2 + y^2 + z^2 = 1$ and $x^2 + y^2 + z^2 = 4$. HINT: $f_{\text{ave}} = \frac{\iiint f dV}{\iiint 1 dV}$

- a. $\frac{3}{4}$
- b. $\frac{5}{8}$
- c. $\frac{3}{7}$
- d. 4π
- e. 8π