Homework questions for sections 16.4, 16.5, 16.6 *Math 114, Spring 2008*

1. Let R be the region

$$\{(x, y) \mid 0 \leq x \leq 2, 0 \leq y \leq \sqrt{4 - x^2}\}.$$

Evaluate the double integral,

$$\int\int_R (x^2 - y^2) dA.$$

Use polar coordinates.

A) 1 B) $\sqrt{2}$ C) $\frac{1}{\sqrt{2}}$ D) $\sqrt{3}$ E) $\frac{1}{\sqrt{3}}$ F) 0

2. Find the coordinates of the center of mass of the triangle with vertices $(-1, 0)$, $(1, 0)$ and $(0, 4)$ if the mass density is $\rho(x, y) = x^2$.

A) 3 B) 5 C) 15 D) $\frac{2}{3}$ E) $\frac{4}{5}$ F) $\frac{14}{15}$

3. Find the area of the piece of the quadric surface (a 'saddle')

$$z = xy$$

that lies between the cylinders $x^2 + y^2 = 1$ and $x^2 + y^2 = 4$.

A) $\frac{2\pi}{3}$

B) $\frac{2\pi}{3}(2\sqrt{2} - 1)$

C) $\frac{2\pi}{3}(5\sqrt{5} - 2\sqrt{2})$

D) $\frac{4\pi}{3}$

E) $\frac{4\pi}{3}(2\sqrt{2} - 1)$

F) $\frac{4\pi}{3}(5\sqrt{5} - 2\sqrt{2})$