Fake Quiz 2 Calc 3 10/22/2019

This is a fake quiz, this is *only* a fake quiz. In the event of an actual quiz, you'd have been given fair warning. Repeat: This is *only* a fake quiz.

1. Let $f(x,y) = 4x^2 + 9y^2$. Let R be the parallelogram with vertices (0,0), (2,2), (2,5), and (0,3). Set up an iterated integral for $\iint_R f\,dA$.

$$\int_0^2 \int_x^{x+3} \left(4x^2 + 9y^2\right) dy\,dx$$

2. Set up iterated integrals for the center of mass of the first-quadrant portion of a circle with radius 1 and evaluate them.

$$\bar{x} = \frac{\int_0^{\pi/2} \int_0^1 kr^2 \cos\theta\, dr\, d\theta}{\int_0^{\pi/2} \int_0^1 kr\, dr\, d\theta} = \frac{4}{3\pi}$$

$$\bar{y} = \frac{\int_0^{\pi/2} \int_0^1 kr^2 \sin\theta\, dr\, d\theta}{\int_0^{\pi/2} \int_0^1 kr\, dr\, d\theta} = \frac{4}{3\pi}$$

3. Set up an iterated integral for the volume above $z = \sqrt{x^2 + y^2}$ and below $z = 9$.

$$\int_0^{2\pi} \int_0^9 \int_r^9 1 r \, dz \, dr \, d\theta$$

4. Set up an iterated integral for the volume above $z = \sqrt{x^2 + y^2}$ and inside $x^2 + y^2 + z^2 = 9$.

$$\int_0^{2\pi} \int_0^{\pi/4} \int_0^3 1 \rho^2 \sin\phi \, d\rho \, d\phi \, d\theta$$