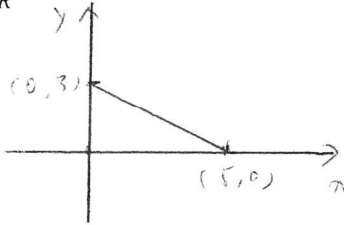


Quiz 2b Calc 3 11/1/2013

Each problem is worth 2 points. For full credit provide complete justification for your answers. Set up in terms of a single coordinate system, i.e., if you use cylindrical your integral should involve no x or y , etc.

1. Set up $\iint_R k(y+a) dA$, for R the triangle with vertices $(0,0)$, $(5,0)$, and $(0,3)$.



$$y = ax + 3$$

$$0 = 5a + 3$$

$$-3 = 5a$$

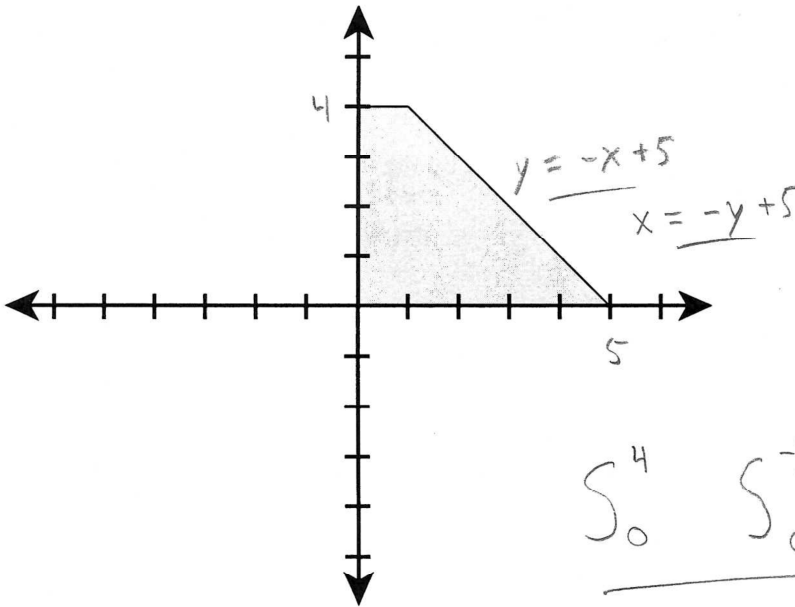
$$a = -\frac{3}{5}$$

$$y = -\frac{3}{5}x + 3$$

$$\int_0^5 \int_0^{-\frac{3}{5}x+3} k(y+a) dy dx$$

Great!

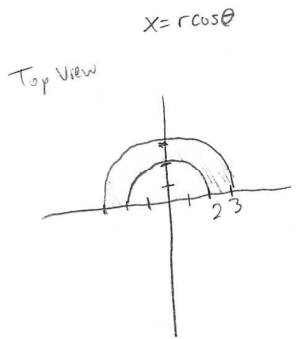
2. Set up an iterated integral for the volume below $z = x^2y$, above the region shown below.



$$\int_0^4 \int_0^{-y+5} x^2 y dx dy$$

Great

3. Set up iterated integrals for $\iint_R x dA$, where R is the region outside a circle with radius 2, but inside a circle with radius 3, with $y \geq 0$.

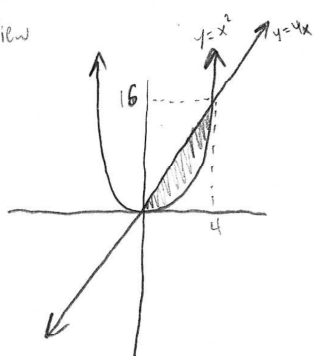


$$\int_0^{\pi} \int_2^3 r \cos \theta (r) dr d\theta$$

Excellent!

4. Let R be the region in the xy -plane between $y = x^2$ and $y = 4x$. Set up an integral for the volume of the solid above R and below $f(x, y)$.

Top View

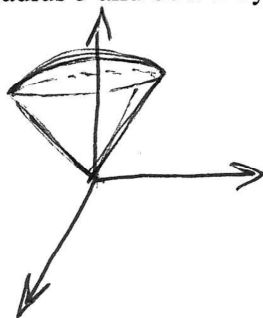


$$\begin{aligned} x^2 &= 4x \\ x(x-4) &= 0 \\ x &= 0, 4 \\ y &= 0, 16 \end{aligned}$$

$$V = \int_0^4 \int_{x^2}^{4x} f(x, y) dy dx$$

Excellent

5. Set up an integral for the volume of the region bounded above by the top half of a sphere with radius 5 and below by the cone $z = \sqrt{x^2 + y^2}$.



$$z = \sqrt{r^2}$$

$$z = r$$

$$\rho \cos \phi = \rho \sin \phi$$

$$\cos \phi = \sin \phi$$

$$1 = \frac{\sin \phi}{\cos \phi}$$

$$1 = \tan \phi$$

$$\tan^{-1} 1 = \phi$$

$$\phi = \frac{\pi}{4}$$

$$\text{Volume} = \int_0^{2\pi} \int_0^{\pi/4} \int_0^5 1 \cdot \rho^2 \sin \phi d\rho d\phi d\theta$$