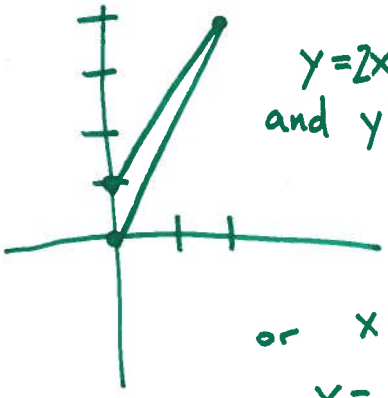
Math 1260 - Quiz 6

1. Let S be the triangular region with vertices at $(0,0), (2,4)$, and $(0,1)$. If $f(x,y) = \sin(xy)$ set up (but do not evaluate) two integrals that compute $\int\int_S f(x,y)dA$. One integral should be $dy\ dx$ and the other $dx\ dy$.



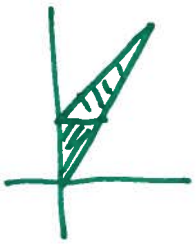
$y = 2x$ and $y = \frac{3}{2}x + 1$

or $x = \frac{y}{2}$

$x = \frac{2}{3}y - \frac{2}{3}$

(I) $\int_0^2 \int_{2x}^{\frac{3}{2}x+1} \sin(xy)\, dy\, dx$

(II)



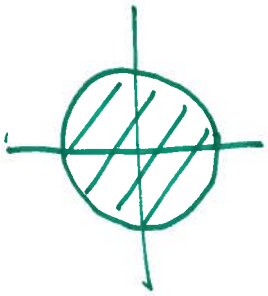
Two parts: $\int_0^1 \int_0^{y/2} \sin(xy)\, dx\, dy$

$+ \int_1^4 \int_{\frac{2}{3}y-\frac{2}{3}}^{y/2} \sin(xy)\, dx\, dy$

2. Consider the 3-dimensional region below the paraboloid $z = 4 - x^2 - y^2$ and above the xy plane. Set up (but do not evaluate) an integral that computes the volume of this region. (Hint: your first step should be to compute the region S in the xy plane over which you want to compute the integral.

In x-y plane: $0 = 4 - x^2 - y^2$ so $x^2 + y^2 = 4$

$S =$



$$\int_{-2}^{2} \int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}} 4 - x^2 - y^2\, dy\, dx$$