

# Quiz 1

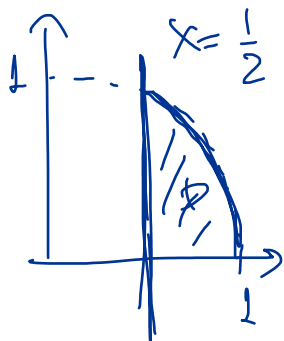
Name: \_\_\_\_\_

Student ID Number: \_\_\_\_\_

1. Set up **but do not evaluate** the integral  $\iint_D f(x,y) dA$  where  $f(x,y) = y^2$  and

$$D = \{(x,y) : x^2 + y^2 \leq 1, x \geq \frac{1}{2} \text{ and } y \geq 0\}$$

in the order  $dx dy$ .



find y-intersection of  $x=1$ ,  $x^2+y^2=1$

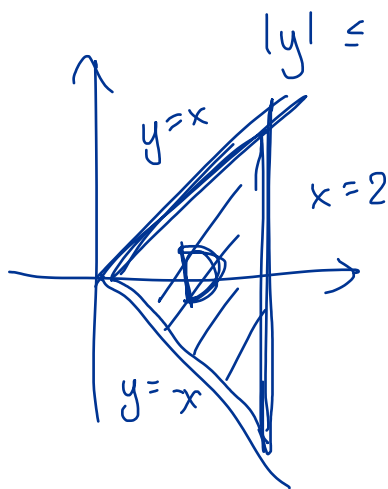
$$\frac{1}{4} + y^2 = 1 \Rightarrow y = \frac{\sqrt{3}}{2}$$

so

$$\iint_D f(x,y) dA = \int_0^{\frac{\sqrt{3}}{2}} \int_{\frac{1}{2}}^{\sqrt{1-y^2}} y^2 dx dy$$

2. Set up **but do not evaluate** the integral  $\iint_D f(x,y) dA$  in **polar coordinates**, where  $f(x,y) = x$  and

$$D = \{(x,y) : |y| \leq x \text{ and } x \leq 2\}.$$



$$|y| \leq x \Rightarrow -x \leq y \leq x, x \geq 0$$

$$y=x \Rightarrow r \sin \theta = r \cos \theta$$

$$\Rightarrow \tan \theta = 1 \Rightarrow \theta = \frac{\pi}{4}$$

$$y=-x \Rightarrow \tan \theta = -1 \Rightarrow \theta = -\frac{\pi}{4}$$

$$x=2 \Rightarrow r \cos \theta = 2 \Rightarrow r = \frac{2}{\cos \theta}$$

$$\iint_D f(x,y) dA = \int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \int_0^{\frac{2}{\cos \theta}} r \cos \theta r dr d\theta.$$