

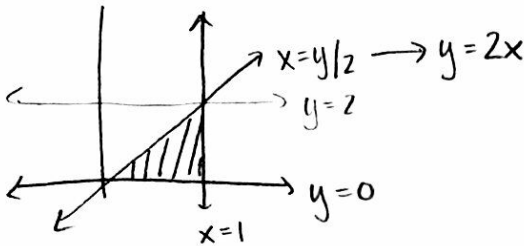
# Quiz 18

April 11, 2016

1.

$$\int_0^2 \int_{y/2}^1 e^{x^2} dx dy$$

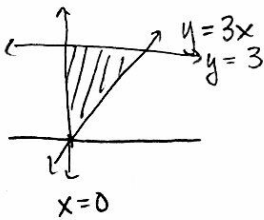
- (a) Sketch the region integrated over in the double integral above. Shade the region and label all curves bounding the region.



- (b) Evaluate the integral, rounding to 3 decimal places.

$$\begin{aligned} \int_0^2 \int_{y/2}^1 e^{x^2} dx dy &= \int_0^1 \int_0^{2x} e^{x^2} dy dx \\ &= \int_0^1 2x e^{x^2} dx \quad \begin{array}{l} u=x^2 \\ du=2x dx \end{array} \\ &= e^{x^2} \Big|_0^1 = e^1 - e^0 = \boxed{1.718} \end{aligned}$$

2. Given that  $\int_0^1 \int_{3x}^3 10xy^2 dy dx = 27$ , find the average value of  $f(x, y) = 10xy^2$  over the region bounded by  $y = 3x$ ,  $y = 3$  and the  $y$ -axis.



same as the region integrated over

$$\begin{aligned} \text{So Avg Value} &= \frac{1}{\text{Area}(R)} \iint_R f(x, y) dA \\ &= \frac{1}{\frac{1}{2}(1)(3)} (27) = \boxed{18} \end{aligned}$$