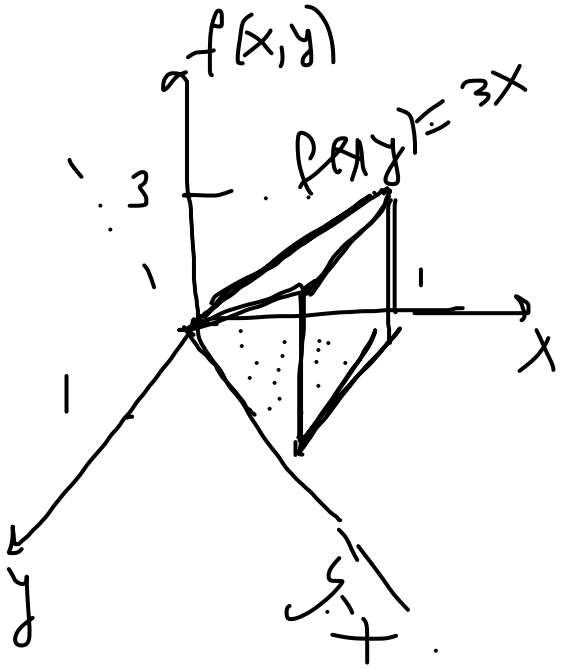
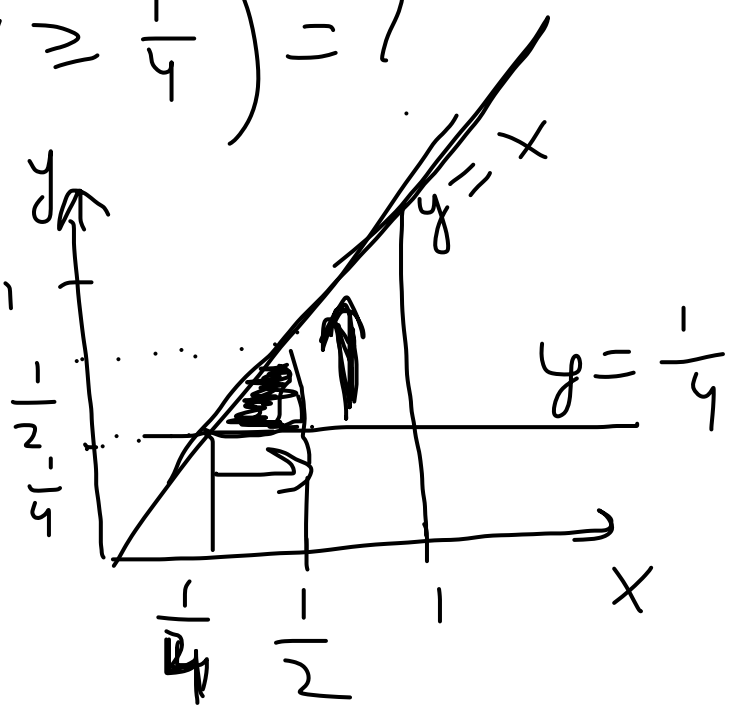
Ex.

$$f(x,y) = \begin{cases} 3x, & 0 \le y \le x \le 1 \\ 0, & \text{elsewhere} \end{cases}$$

$$P\left(0 \le X \le \frac{1}{2},\ Y \ge \frac{1}{4}\right) = ?$$





$$P\left(0 \le X \le \frac{1}{2},\ Y \ge \frac{1}{4}\right) =$$

$$= \int_{1/4}^{1/2} \int_{1/4}^{x} 3x \, dy \, dx$$

$$= \int_{1/4}^{1/2} 3x\left(x - \frac{1}{4}\right) dx =$$

$$\int_{1/4}^{1/2} \left(3x^2 - \frac{3}{4}x\right) dx$$

$$= \left(x^3 - \frac{3}{8}x^2\right)\Big|_{1/4}^{1/2}$$

$$= \frac{5}{128}$$