

9/15 Rahul Paleja

Section: 22

①

$$\iint_D xy \, dA$$

where $D = \{(x, y) \mid x^2 + y^2 \leq 1, x \geq 0, y \geq 0\}$

$$\{(r, \theta) \mid 0 \leq \theta \leq \frac{\pi}{2}, 0 \leq r \leq 1\}$$

$$\int_0^{\pi/2} \int_0^1 r \cos \theta r \sin \theta \, dr \, d\theta$$

$$= \frac{1}{8}$$

②

$$\int_0^1 \int_0^{\sqrt{1-y^2}} e^{x^2+y^2} \, dx \, dy$$

must be positive

$$D: \{(x, y) \mid 0 \leq y \leq 1, 0 \leq x \leq \sqrt{1-y^2}\}$$

$$D: \{(r, \theta) \mid 0 \leq \theta \leq \frac{\pi}{2}, 0 \leq r \leq 1\}$$

$$\int_0^{\pi/2} \int_0^1 e^{r^2} r \, dr \, d\theta = \frac{1}{4}(e-1)\pi$$