

$$1. \iint_D xy \, dA \quad D = \{(x, y) \mid x^2 + y^2 \leq 1, x \geq 0, y \geq 0\}$$

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

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

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

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

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

$$\int_0^{\frac{\pi}{2}} \int_0^1 e^{r^2} r \, dr \, d\theta$$

$$= \frac{1}{4}(e-1)\pi$$

