

$$7. f(x,y) = x+y \quad R: x^2 + y^2 \leq 16, x \geq 0, y \geq 0$$

$$\int_{\theta=0}^{\theta=\frac{\pi}{2}} \int_{r=0}^{r=4} (r \cos \theta + r \sin \theta) r \, dr \, d\theta$$



$$= \int_{\theta=0}^{\theta=\frac{\pi}{2}} \int_{r=0}^{r=4} r^2 (\cos \theta + \sin \theta) \, dr \, d\theta$$

$$x = r \cos \theta$$

$$y = r \sin \theta$$

$$= \int_{\theta=0}^{\theta=\frac{\pi}{2}} \left[\frac{1}{3} r^3 (\cos \theta + \sin \theta) \right]_{r=0}^{r=4} d\theta$$

$$= \frac{1}{3} \int_{\theta=0}^{\theta=\frac{\pi}{2}} (\cos \theta + \sin \theta) [r^3]_{r=0}^{r=4} d\theta$$

$$= \frac{1}{3} \int_{\theta=0}^{\theta=\frac{\pi}{2}} (\cos \theta + \sin \theta) [4^3 - 0^3] d\theta$$

$$= \frac{1}{3} \cdot 64 \int_{\theta=0}^{\theta=\frac{\pi}{2}} (\cos \theta + \sin \theta) d\theta$$

$$= \frac{64}{3} [\sin \theta - \cos \theta]_{\theta=0}^{\theta=\frac{\pi}{2}}$$

$$= \frac{64}{3} \left[\sin \frac{\pi}{2} - \cos \frac{\pi}{2} - (\sin 0 - \cos 0) \right]$$

$$= \frac{64}{3} [1 - 0 - (0 - 1)]$$

$$= \frac{64}{3} [2] = \left(\frac{128}{3} \right)$$