

$$5. \int_{x=0}^{x=1} \int_{y=0}^{y=\sqrt{1-x^2}} (x^2+y^2)^{\frac{5}{2}} dy dx$$



$$\int_{\theta=0}^{\theta=\frac{\pi}{2}} \int_{r=0}^{r=1} (r^2)^{\frac{5}{2}} r dr d\theta$$

$$= \int_{\theta=0}^{\theta=\frac{\pi}{2}} \int_{r=0}^{r=1} r^5 r dr d\theta$$

$$= \int_{\theta=0}^{\theta=\frac{\pi}{2}} \int_{r=0}^{r=1} r^6 dr d\theta$$

$$= \int_{\theta=0}^{\theta=\frac{\pi}{2}} \left[\frac{1}{7} r^7 \right]_{r=0}^{r=1} d\theta$$

$$= \frac{1}{7} \int_{\theta=0}^{\theta=\frac{\pi}{2}} [1^7 - 0^7] d\theta$$

$$= \frac{1}{7} \int_{\theta=0}^{\theta=\frac{\pi}{2}} d\theta$$

$$= \frac{1}{7} [\theta]_{\theta=0}^{\theta=\frac{\pi}{2}}$$

$$= \frac{1}{7} \left[\frac{\pi}{2} - 0 \right]$$

$$= \frac{\pi}{14}$$