45) $z = xy \quad x^2+y^2=1 \quad r^2=1 \quad r \in [0,1] \quad \theta \in [0,2\pi]$

$\dfrac{\partial z}{\partial x} = y \quad \dfrac{\partial z}{\partial y} = x \quad \sqrt{1+x^2+y^2} = r\sqrt{1+r^2}\, dr\, d\theta$

$$A(S) = \int_0^{2\pi} d\theta \int_0^1 r\sqrt{1+r^2}\, dr = 2\pi \int_0^1 r\sqrt{1+r^2}\, dr$$

$v = 1+r^2$
$dv = 2r\,dr$
$\frac{1}{2} dv = r\,dr$

$$= \pi \int_1^2 \sqrt{v}\, dv = \pi\left[\frac{2}{3} v^{3/2}\right]_1^2 =$$

$$\frac{2\pi}{3}\left[2^{3/2}-1\right] = \boxed{\frac{2\pi}{3}(2\sqrt{2}-1)}$$

47) $y = x^2+z^2 \quad x^2+z^2=16 \quad r^2=16 \quad r=4 \quad r \in [0,4] \quad \theta \in [0,2\pi]$

$\dfrac{\partial y}{\partial x} = 2x \quad \dfrac{\partial y}{\partial z} = 2z \quad \sqrt{1+4x^2+4z^2} = \sqrt{1+4r^2}$

$$A(S) = \int_0^{2\pi} d\theta \int_0^4 r\sqrt{1+4r^2}\, dr = 2\pi \int_0^4 r\sqrt{1+4r^2}\, dr$$

$v = 1+4r^2$
$dv = 8r\,dr$
$\frac{1}{8} dv = r\,dr$

$$= \frac{\pi}{4}\int_1^{65} \sqrt{v}\, dv = \frac{\pi}{4}\left[\frac{2}{3}(65)^{3/2} - \frac{2}{3}(1)\right]$$

$$= \frac{2\pi}{12}\left((65)^{3/2}-1\right) = \frac{\pi}{6}(65^{3/2}-1)$$

$$= \boxed{\frac{\pi}{6}(65\sqrt{65}-1)}$$