46. $\displaystyle\int_0^1 \frac{dx}{2\sqrt{3-x}\sqrt{x+1}}$

Let $u = \sqrt{x+1}, u^2 = x+1, 2u\,du = dx,$

$\sqrt{3-x} = \sqrt{4-u^2}.$

$$\int_1^{\sqrt{2}} \frac{2u\,du}{2\sqrt{4-u^2}u} = \int_1^{\sqrt{2}} \frac{du}{\sqrt{4-u^2}}$$

$$= \arcsin\left(\frac{u}{2}\right)\Bigg]_1^{\sqrt{2}}$$

$$= \arcsin\left(\frac{\sqrt{2}}{2}\right) - \arcsin\left(\frac{1}{2}\right)$$

$$= \frac{\pi}{4} - \frac{\pi}{6} = \frac{\pi}{12}$$