

$$\int^x \frac{t}{\sqrt{1-t}} dt$$

$$u = \sqrt{1-t}$$

$$t = 1 - u^2$$

$$\frac{du}{dt} = \frac{1}{2\sqrt{1-t}}$$

$$dt = 2u du$$

$$\Rightarrow \int_{\sqrt{1-x}}^{\sqrt{1-t}} \frac{1-u^2}{\cancel{u}} 2\cancel{u} du$$

$$\int_{\sqrt{1-x}}^{\sqrt{1-t}} 2 - 2u^2 du$$

$$\Rightarrow 2u - \frac{2}{3} u^3 \Big|_{\sqrt{1-x}}^{\sqrt{1-t}}$$

$$= 2\sqrt{1-x} - \frac{2}{3} \sqrt{1-x}^3 \Big|^x$$