

$$f(x) = \sqrt{1-x^2}$$

$$= (1-x^2)^{1/2}$$

$$f'(x) = \frac{1}{2}(1-x^2)^{-1/2} \cdot -2x = \frac{-x}{\sqrt{1-x^2}}$$

$$\sqrt{1+(f'(x))^2} = \sqrt{1+\left(\frac{-x}{\sqrt{1-x^2}}\right)^2}$$

$$= \sqrt{1+\frac{x^2}{1-x^2}}$$

$$= \sqrt{\frac{1-x^2}{1-x^2} + \frac{x^2}{1-x^2}}$$

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

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

$$L = \int_{-1/2}^{1/2} \frac{1}{\sqrt{1-x^2}} dx = \arcsin(x) \Big|_{-1/2}^{1/2}$$

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

UNIT
CIRCLE
TIME!

Sine of (angle between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$) is $\frac{1}{2}$

Sine of (which angle between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$) is $-\frac{1}{2}$

$$= \frac{\pi}{6}$$

$$-\frac{\pi}{6}$$