Some Useful Formulas:

- $L = \int_a^b \sqrt{\frac{1}{2} \left( f''(x) \right)^2} \, dx$
- $L = \int_c^d \sqrt{\frac{1}{2} \left( g''(y) \right)^2} \, dy$
- $L = \int_e^b \sqrt{\left( \frac{dx}{dt} \right)^2 + \left( \frac{dy}{dt} \right)^2} \, dt$

- $\sin^2 \theta + \cos^2 \theta = 1$
- $1 + \tan^2 \theta = \sec^2 \theta$
- $\sin 2\theta = 2 \sin \theta \cos \theta$
- $\sin^2 \theta = \frac{1}{2} (1 - \cos 2\theta)$
- $\cos^2 \theta = \frac{1}{2} (1 + \cos 2\theta)$

- $\sin \alpha \cos \beta = \frac{1}{2} \left[ \sin(\alpha + \beta) + \sin(\alpha - \beta) \right]$
- $\sin \alpha \sin \beta = \frac{1}{2} \left[ \cos(\alpha - \beta) - \cos(\alpha + \beta) \right]$
- $\cos \alpha \cos \beta = \frac{1}{2} \left[ \cos(\alpha - \beta) + \cos(\alpha + \beta) \right]$