P7.1 $\ddot{\theta} = -\omega_0^2 \sin\theta$

$$\frac{d^2(\theta_1+\theta_2)}{dt^2}$$

$$= \ddot{\theta}_1 + \ddot{\theta}_2$$

$$= \boxed{-\omega_0^2(\sin\theta_1 + \sin\theta_2) \neq -\omega_0^2 \sin(\theta_1+\theta_2)}$$

P7.3 $I = mL^2$

$$\frac{1}{2}mL^2\left(\frac{d\theta}{dt}\right)^2 = mgL(\cos\theta - \cos\theta_0)$$

$$\frac{d\theta}{dt} = \sqrt{\frac{2g}{L}(\cos\theta - \cos\theta_0)}$$

$$\frac{d\theta}{dt} = \omega_0\sqrt{2\cos\theta - 2\cos\theta_0}$$

$$\omega_0 dt = \frac{d\theta}{\sqrt{2\cos\theta - 2\cos\theta_0}}$$