HW08a

Monday, September 5, 2016 5:02 PM

Vertical circle:

Top: $N = M\left(\frac{v^2}{R} - g\right) = 9.8\,N$

Bottom $N = M\left(\frac{v^2}{R} + g\right) = 33.4\,N$

$v_{min} = \sqrt{gR}$

Bead: $\theta = \arccos\left(\frac{gT^2}{4\pi^2 L}\right)$

Banked curve:

$$v_{max}^2 = gR\,\frac{\sin\theta + \mu_s\cos\theta}{\cos\theta - \mu_s\sin\theta}$$

$$\boxed{v_{min}^2 = gR\,\frac{\sin\theta - \mu_s\cos\theta}{\cos\theta + \mu_s\sin\theta}}$$

Nonuniform: $T = \frac{MV^2}{L} + Mg\sin\theta - B\cos\theta$

$$\frac{dv}{dt} = \frac{B\sin\theta + Mg\cos\theta}{M}$$