

# answers

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kinematics:

$$V = \sqrt{\frac{D^2 g}{2 \cos^2 \theta (H - h - D \tan \theta)}}$$

$$v_f = \sqrt{V^2 + 2g(H - h)}$$

Forces:  $T = \frac{1}{3} [ P \cos \theta + 2Mg - \mu (2Mg - P \sin \theta) ]$

Circular:  $v = \sqrt{\frac{1}{2} L g \tan \theta \sin \theta}$