Homework 3 Corrections

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1 Dynamics: Problem 2

1.1 B. Determine the tension, normal force, and acceleration

$$a_x = \frac{m_2 g}{m_1 + m_2} = \frac{4kg \times 9.8\frac{m}{s}}{10kg + 4kg}$$

$$\boxed{a_x = 2.8\frac{m}{s^2}}$$

$$T = \frac{m_1 m_2 g}{m_1 + m_2} = \frac{10kg \times 4kg \times 9.8\frac{m}{s^2}}{10kg + 4kg}$$

$$\boxed{T = 28N}$$

$$F_N = F_g = 10kg \times 9.8\frac{m}{s^2}$$

$$\boxed{F_N = 98N}$$

1.2 C. Repeat for situation where the plane is inclined at an angle of 30 degrees and m_2 still hangs.

$$F_{net} = ma_x$$

$$m_2 g - m_1 g sin\theta = (m_1 + m_2)a_x$$

$$a_x = \frac{g(m_2 - m_1 sin\theta)}{m_1 + m_2} = \frac{9.8\frac{m}{s^2} \times (4 - 10sin(30))}{14}$$

$$\boxed{a_x = .7\frac{m}{s^2}}$$

$$T = m_2 g = m_2 a_x = 4kg \times .7\frac{m}{s^2}$$

$$\boxed{T = 42N}$$

2 Dynamics: Problem 3

A mass travels inside a frictional track under the influence of gravity. Determine the minimum velocity required for the mass to keep contact with the track.

$$F_{net} = ma$$

$$F_N + mgsin\theta = ma_c = \frac{mv^2}{r}$$

Solve for V, when $F_N = 0$

$$rgsin\theta = v^2$$

$$\boxed{v = \sqrt{rgsin\theta}}$$