Physics 21 Problem Set 2

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Due Wednesday, Jan. 19 in class

Please make your work neat, clear, and easy to follow. It is hard to grade sloppy work accurately. Generally, make a clear diagram, and label quantities. Derive symbolic answers, and then plug in numbers after a symbolic answer is available.

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1. Redo example 2.3 on page 72 of the text, but this time the freight car on the left has mass $M/2$, the one in the middle has mass M, and the one on the right has mass $3M/2$.

2. Fig. 1 shows two strings supporting an object of weight $\boldsymbol{W}$. Everything is at rest, and $\theta_A = 18°$ and $\theta_B = 43°$. Evaluate the magnitudes of $\boldsymbol{F}_A$ and $\boldsymbol{F}_B$ in terms of $\boldsymbol{W}$.
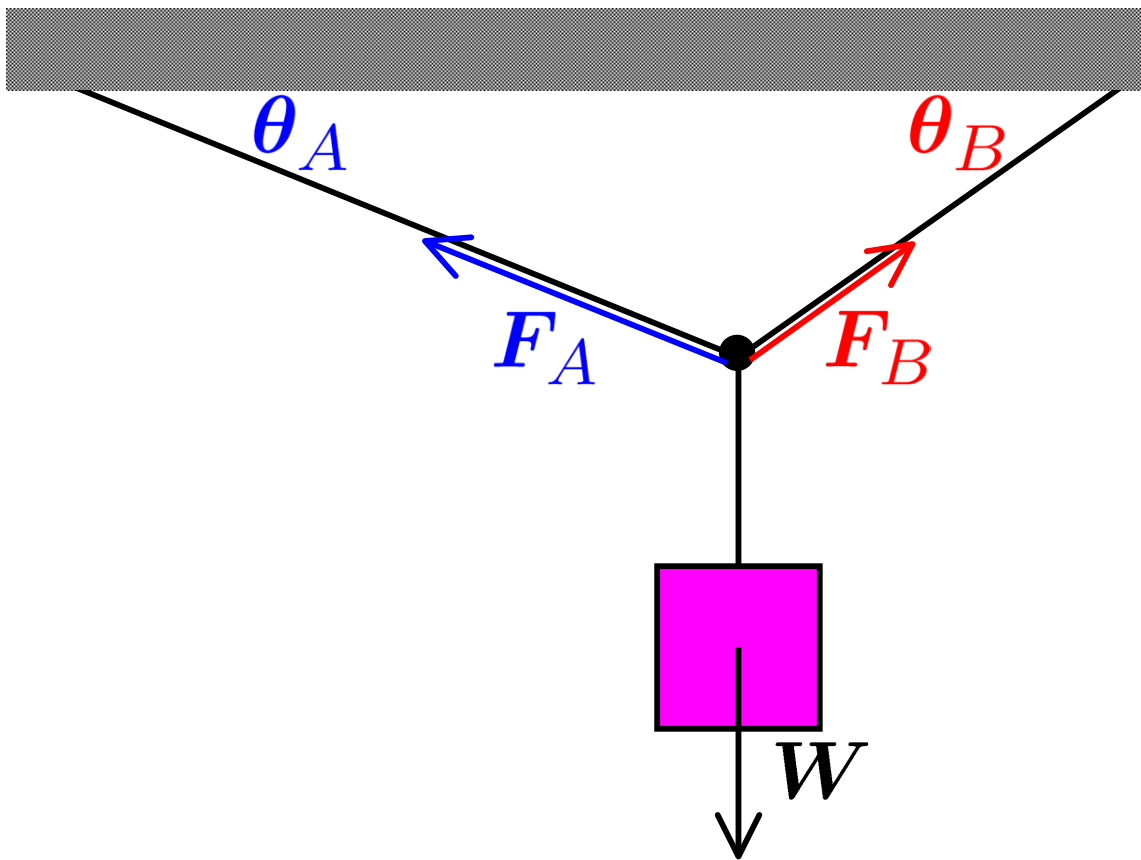

Figure 1: For use in problem 2.

3. A block of mass m_1 and weight W_1 is on a frictionless inclined plane of angle θ as shown in Fig. 2. The mass is connected by a cord over a small frictionless pully to a second block of mass m_2 and W_2 hanging

vertically. Derive an expression for the acceleration of the masses, in terms of the weights, masses, and the angle θ. What equation must be satisfied for the blocks to be at rest?
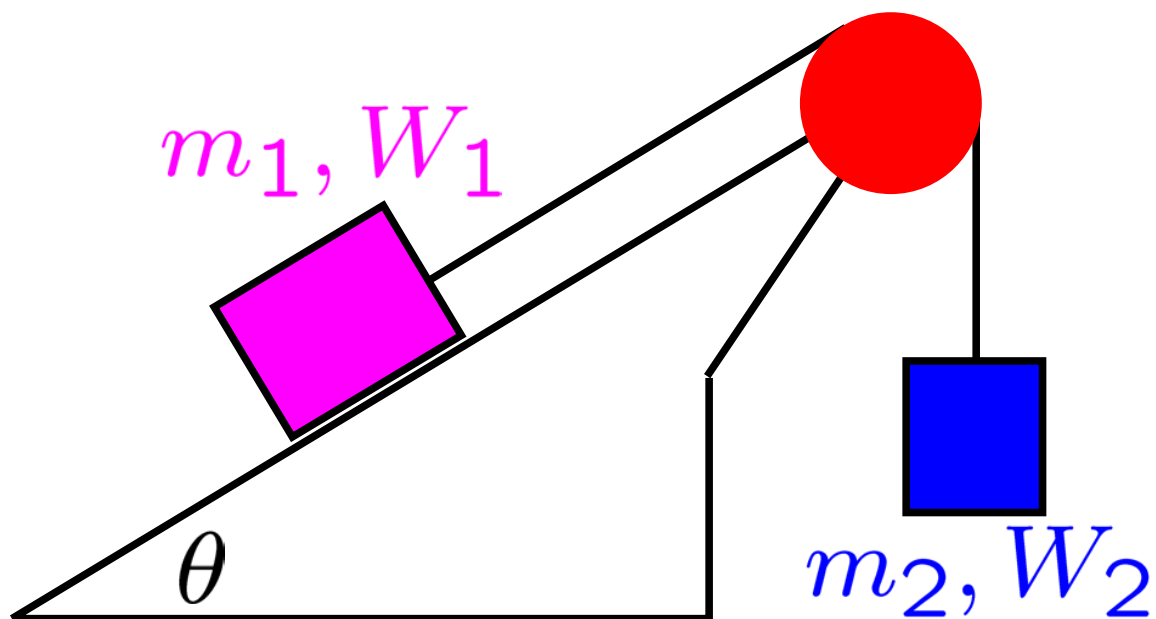
$$m_1, W_1$$

$$\theta$$

$$m_2, W_2$$

Figure 2: For use in problem 3.

4. K&K 2.5.

5. K&K 1.15.