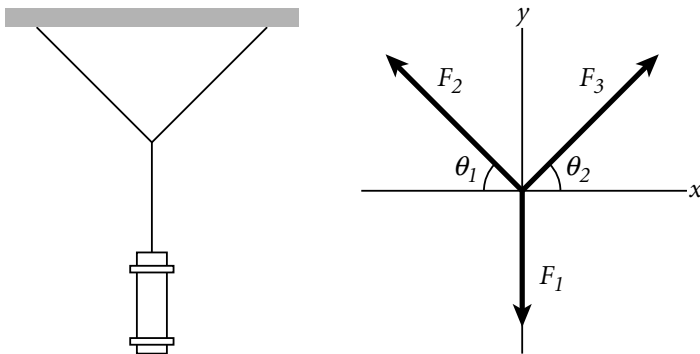


Section
4-2

HOLT PHYSICS
Diagram Skills

Newton's First Law

A lantern of mass m is suspended by a string that is tied to two other strings, as shown in the figure below. The free-body diagram shows the forces exerted by the three strings on the knot.



1. In terms of F_1 , F_2 , and F_3 , what is the net force acting on the knot?
(Hint: The lantern is in equilibrium.)

2. Find the magnitudes of the x and y components for each force acting on the knot. (Assume the positive directions are to the right and up.)

String 1 (F_1) x component _____ y component _____

String 2 (F_2) x component _____ y component _____

String 3 (F_3) x component _____ y component _____

3. In terms of F_1 , F_2 , and F_3 , what is the magnitudes of the net force acting on the knot in the x direction? in the y direction?

$F_{x\ net} =$ _____

$F_{y\ net} =$ _____

4. Assume that $\theta_1 = 30^\circ$, $\theta_2 = 60^\circ$, and the mass of the lantern is 2.1 kg. Find F_1 , F_2 , and F_3 .

$F_1 =$ _____

$F_2 =$ _____

$F_3 =$ _____

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