NEWTON IN 2-D, INCLINED PLANES, PULLEYS COLLABORATIVE PROBLEMS

*Fnet*

*m2*



*θ3*

*θ1*

*m3*

*m1*

Determine tension on each rope and the acceleration of the system.

Note: The tension on each rope will be in terms of *m1*.

Given:

*m2*is half of *m1*;

*m3* is five times *m1;*

*θ1* = 40.0o;

*θ3* = 50.0o;

*µk* = 0.056

1. ONLY TO BE ATTEMPTED WHEN YOU HAVE COMPLETED #1.

A 4U physics student, leaving on a March Break holiday, pulls a 35.0 kg suitcase with an acceleration of 0.15 m/s2 by pulling on a strap at an angle θ above the horizontal. The student pulls on the strap with a force of 55.0 N. The force of friction, opposite to the horizontal motion of the suitcase, is 25 N.

1. What is the value of θ? (HINT: $\tan(θ)= \frac{\sin(θ)}{\cos(θ)}$ )
2. What normal force does the ground exert on the suitcase?