Force analysis, part 5

General problem solving strategy

1. Draw a picture
2. List knowns and unknowns (especially for kinematic problems)
3. For force analysis – free body diagram and components
4. Develop a strategy for solving for the unknown

Tips for using Newton's 2nd law:

1. Identify all of the forces present in the system
2. Choose the best coordinate system
3. Represent the force vectors in the coordinate system
4. Analyze Newton's 2nd law separately for each direction

Question 5

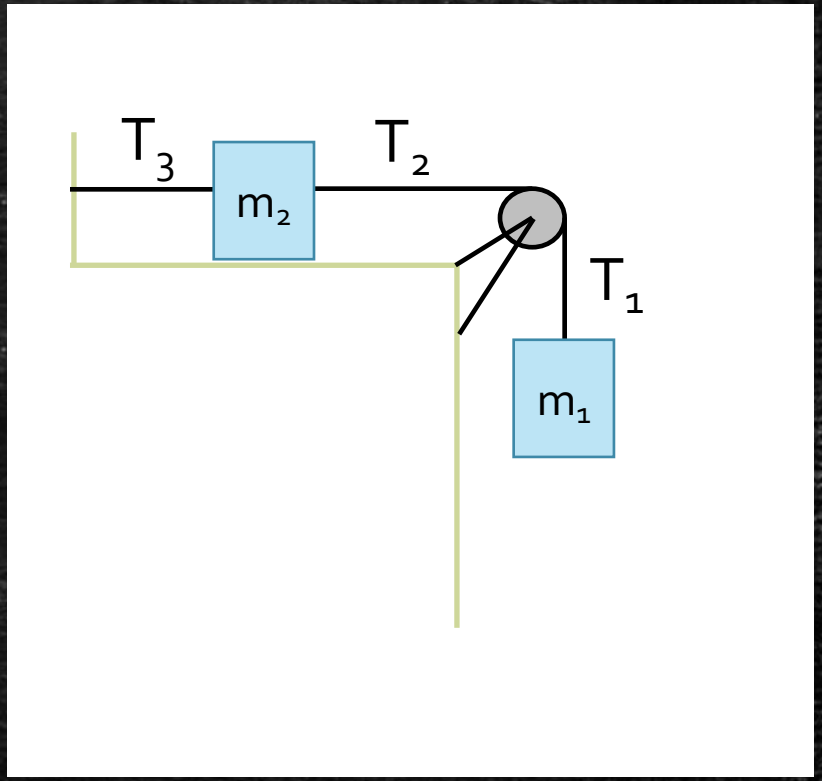
- Take m_1 = 2.00 kg and m_2 = 10.0 kg, and consider the pulley to be frictionless.

Solve for the following:

(a) T_1

(b) T_2

(c) T_3

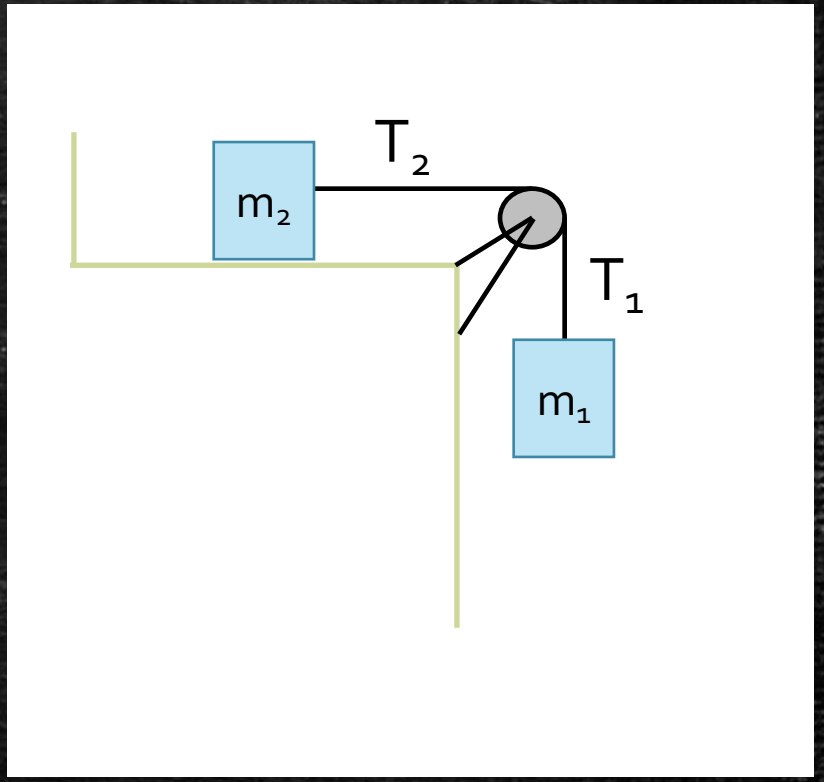


Question 6

- Take m_1 = 2.00 kg and m_2 = 10.0 kg. Consider friction on the horizontal surface with μ_s=0.60 and μ_k=0.25, and take the pulley to be frictionless.

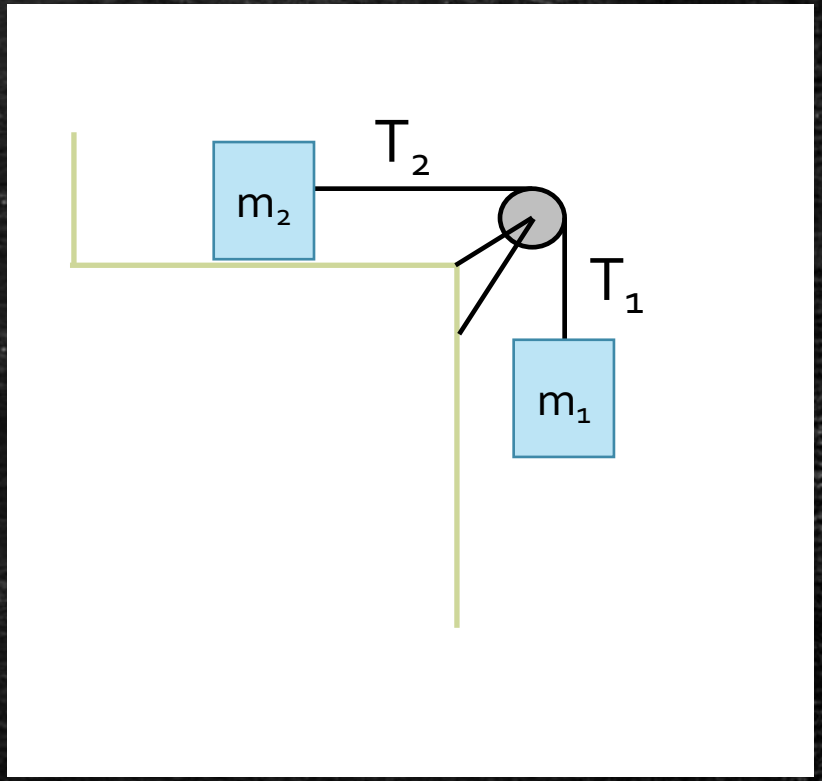
- The system starts at rest.

Solve for the acceleration of the system.



Question 7

- Take m_1 = 2.00 kg and m_2 = 10.0 kg. Consider friction on the horizontal surface with μ_s=0.60 and μ_k=0.25, and take the pulley to be frictionless.



- The hanging mass is now pulled to give it an initial downward speed of 0.5 m/s.

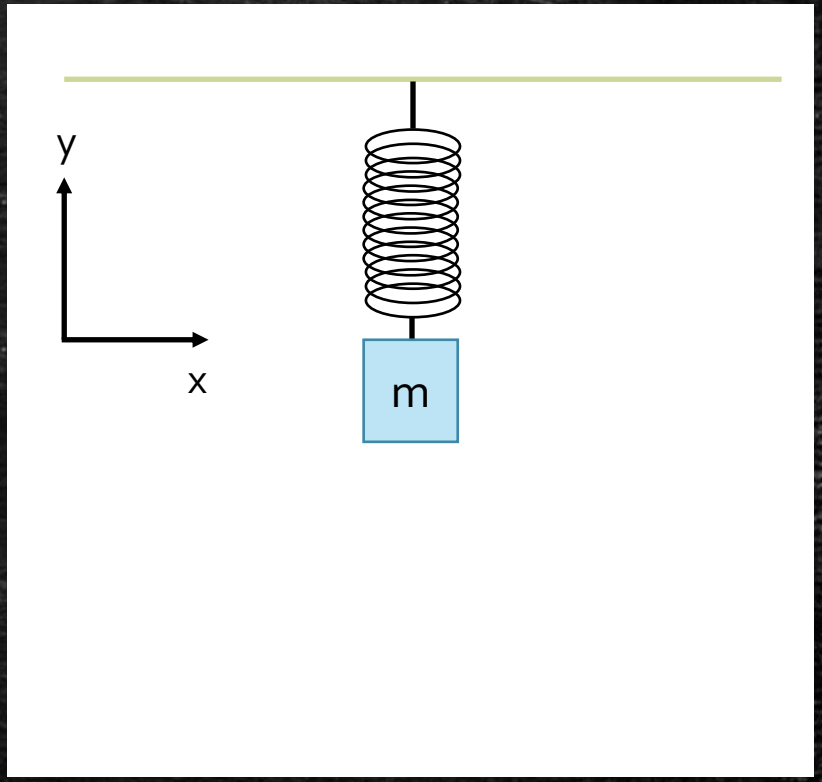
Solve for the acceleration of the system.

Question 8

- Take m=5.0 kg and k = 620 kg/s^2.

What is the displacement of the mass from the spring's equilibrium point (along the y axis)?

Provide your answer in units of cm with two significant digits.



Question 9

- Take m=5 kg, k = 620 kg/s^2 and the slope angle θ=25^o. Assume the slope is frictionless.

What is the displacement of the mass from the spring's equilibrium point (along the x axis)?

Provide your answer in units of cm with two significant digits.