Physics 40S **Dynamics Worksheet #3**

1. Two bodies are suspended by means of a string that passes over a weightless, frictionless pulley. If one of the bodies has a mass of 18 kg and the other 14 kg, what is the acceleration of the system and the tension in the string? ($1.23\ m/s^2\ [cw]$, $T = 154\ N$)

2. A cord passing over a pulley has a 8 kg mass tied on one end and a 9 kg mass on the other. Determine the acceleration of the system and the tension in the cord. ($0.58\ m/s^2\ [cw]$, $T = 83\ N$)

3. A string passing over a frictionless pulley has a 4 kg object tied on one end and a 12 kg object on the other end.
   a. Calculate the acceleration and the tension in the string. ($4.9\ m/s^2\ [cw]$, $T = 58.8\ N$)
   b. What will be its velocity after 2 s? ($9.8\ m/s\ [cw]$)

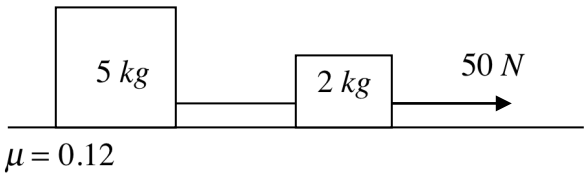
4. A 20 kg object rests on a smooth table. It is fastened by a string that passes over a frictionless pulley to a mass of 3 kg that hangs freely. Find the acceleration of the system and the tension in the string. ($1.28\ m/s^2\ [cw]$, $T = 25.6\ N$)

5. A 6 kg block rests on a smooth table. A string passes over a frictionless pulley and a 3 kg mass is attached to its end.
   a. Determine the acceleration of the system and the tension in the string. ($3.27\ m/s^2\ [cw]$, $T = 19.6\ N$)
   b. What will be the velocity of the block after 1.5 s? ($4.9\ m/s\ [cw]$)

6. A 100 kg object is moved along a horizontal surface by a cord parallel to the surface and running over a frictionless pulley, the other end of the cord supporting a mass of 25 kg. What is the acceleration of the objects and the tension in the cord if the friction on the surface is 40 N? ($1.64\ m/s^2\ [cw]$, $T = 204\ N$)

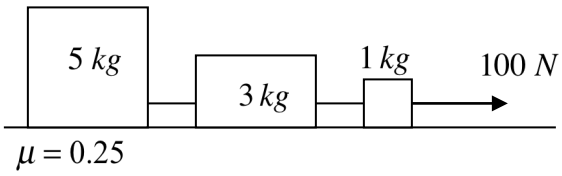
Calculate the acceleration and the tensions (#7 & #8 only) in the following diagrams.

7.



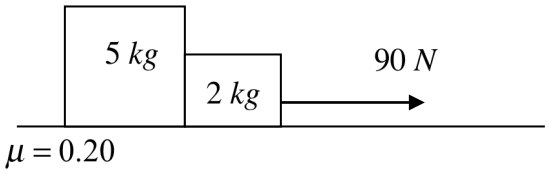
($5.97\ m/s^2\ [right]$, $T = 35.7\ N$)

8.



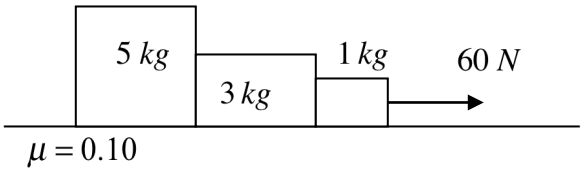
($8.66\ m/s^2\ [right]$, $T = 55.6\ N,\ 88.9\ N$)

9.



$(10.9\ m/s^2\ \left[right\right])$

10.



$(5.69\ m/s^2\ \left[right\right])$