Physics 211 Problem Set 5 Due Friday, 10/04/19
Last Name:_____ First Name _____
Workshop time or section:_____TA name or Room # _____

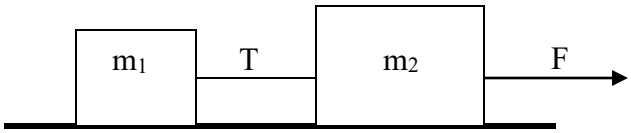
Please submit your homework on this sheet. If you need more space than is available, please attach additional sheets of paper.

1. A 4 kg object has a velocity of 3m/s along *x*-direction at t=0s ($v_{i\,x}$=3 m/s, $v_{i\,y}$=0 m/s). Eight seconds later, its velocity changes to $v_{f\,x}$=8 m/s, $v_{f\,y}$=10 m/s). Assuming the object was subject to a constant total force, find

   (a) the *x*- and *y*-components of force

   (b) its magnitude

2. Two masses m_1=2.0 kg, and m_2=3.0 kg situated on a frictionless, horizontal surface are connected by a light (massless) not stretchable string. A force F=4 N is exerted on m_2 to the right (see below).



   (a) Draw and label separate free-body diagrams for m_1 and m_2.

   Block m_1 | Block m_2

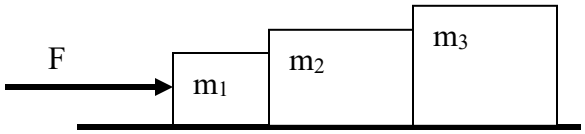
   (b) Are any of the forces applied to m_1 equal in magnitude to forces applied to m_2? Explain.

   (c) Draw vectors to show direction of the acceleration of each mass. Are they in the same or opposite direction? Do they have the same or different magnitudes?

(d) Determine the acceleration of m_1.

(e) Determine the tension in the string.

3. Three blocks (m_1=2 kg, m_2=3 kg, m_3=4 kg) are in contact with each other on a frictionless, horizontal surface as shown below. A horizontal force F=18 N is applied to m_1.



Draw free-body diagrams and mark pairs of forces satisfying 3rd Newton's Law.

Block m_1	Block m_2	Block m_3

(a) find the acceleration of the blocks

(b) find the magnitudes of the net forces on each block

(c) find the magnitudes of the contact forces between the blocks