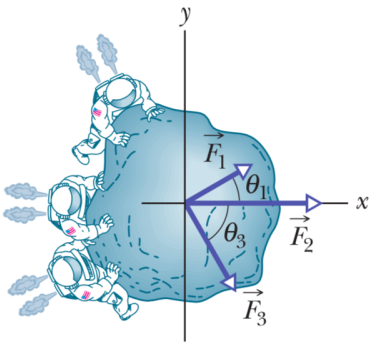
Homework 6

Due Wednesday, October 16 at 7pm

Finish reading Ch. 5 and start Ch. 6.

Exercises:

1. Three astronauts, propelled by jet backpacks, push and guide a 120 kg asteroid toward a processing dock, exerting the forces shown in the figure at right, with $F_1 = 30$ N, $F_2 = 50$ N, $F_3 = 40$ N, $\theta_1 = 30°$, and $\theta_3 = 60°$. What is the asteroids acceleration (a) in unit-vector notation and as (b) a magnitude and (c) a direction relative to the positive direction of the x-axis?



2. In earlier days, horses pulled barges down canals in the manner shown below. Suppose the horse pulls on the rope with a force of 8000 N at an angle of $\theta = 10°$ to the direction of motion of the barge, which is headed straight along the positive direction of an x-axis. The mass of the barge is 9500 kg, and the magnitude of its acceleration is 0.1 m/s^2. What are the (a) magnitude and (b) direction (relative to positive x) of the force on the barge from the water? (c) After evaluating your answer with numbers consider the limits $\theta \to 0$ and $\theta \to 90°$. Do both limits of your answer makes sense?