

DYNAMICS – Additional Review

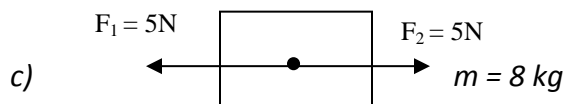
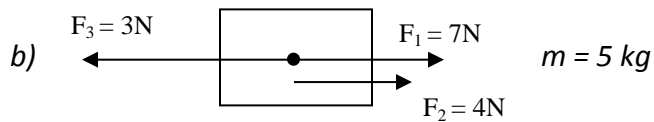
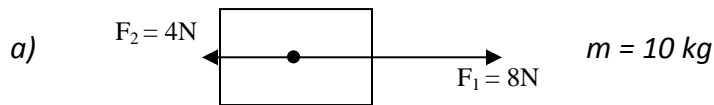
Name: _____ Date: _____

List of Potentially Useful Equations:

$$v_2 = v_1 + a\Delta t \qquad \Delta d = v_1\Delta t + \frac{1}{2}a\Delta t^2 \qquad v_{av} = \frac{\Delta d}{\Delta t} = \frac{v_1 + v_2}{2}$$

$$v_2^2 = v_1^2 + 2a\Delta d \qquad F_{net} = \Sigma F = ma \qquad F_f = \mu F_N \qquad F_g = mg$$

1. From the following situations determine if the object in question will accelerate, and if so, in which direction and with what magnitude? *You do not need to worry about the normal force, weight or friction for this problem.*



2. **Defend** or **criticize** the following **two** statements.
- a) An object moving at *constant* speed (not accelerating) must have no forces acting on it.
- a) An object at rest must have no forces acting on.
3. An astronaut, standing on the surface of the moon, weighs 150 N. The acceleration due to gravity on the moon is $\frac{1}{6}$ the acceleration due to gravity on earth.
- a) Calculate the astronaut's mass.
- b) Is her mass different on the moon than it is on Earth?
4. An applied force of 10 N keeps a 5 kg mass moving at constant velocity.
- a) Draw a free body diagram for this situation.

- b) Determine the frictional force. (**HINT:** *What does constant velocity imply?*)
- c) Calculate the coefficient of friction.
5. A dragster reaches 350 km/h from rest in 6.2 s. If the car is 800 kg and generates a driving force of 16000 N, find the force of friction on the car. (Include an FBD).

6. A 500 kg Quantum Banana Car is accelerating to the right at 4.0 m/s^2 . The engine supplies a force of 4150 N to the right and air resistance was measured at 170 N. Determine the coefficient of friction, μ , between the tires and the road. (Include an FBD).
7. A 67 kg physics student is standing in an elevator. The student looks down at the elevator and (for some odd reason standing on a Newton scale) and reads that her weight is 710 N . Is the student accelerating up, down, or is she stationary or moving at a constant speed. How do you know. If she is accelerating, state the direction and calculate the acceleration. (A F.B.D. is necessary)