

# PHY121 Summer 2018

## Pre-work for Wednesday 5/23

1. Draw free-body diagrams for each object. Determine the direction of acceleration for each object.
  - (a) A book is at rest on top of a table.
  - (b) An egg is falling from a tree (neglect air resistance).
  - (c) A flying squirrel is gliding from a tree to the ground at constant velocity.
  - (d) A rightward force is applied to a box on a rough (frictionful!) surface such that it will move from rest.
  - (e) A rightward force is applied to a box on a rough surface such that it moves with a constant velocity.
  - (f) A skydiver is falling at terminal velocity.
  - (g) A skier is sliding down a ski slope with an angle of  $25^\circ$ . Neglect frictional forces.
  - (h) A ball is moving upward toward the peak of its motion after being thrown.
2. Look up a definition for force and write it down. Look up a second definition of force and compare the differences. Which makes more intuitive sense to you? Do either of these constitute a good definition for the conceptual idea of a force? Explain your reasoning.
3. You are standing in an elevator on a scale. Your weight reads 40 N (you... might be a cat). For the following cases, draw free-body diagrams for both the elevator and yourself. Also, determine whether the scale will read a weight that is greater than while at rest, less than while at rest, or the same.
  - (a) The elevator is stopped on the first floor.
  - (b) The elevator is accelerating upward.
  - (c) The elevator is moving upward at a constant velocity.
  - (d) The elevator is slowing down while moving in the upward direction.