Multiple choice. Indicate the best answer.



1. A boy pulls on a rope that is tied to a tree. Which of the following accurately represents a Newton’s Third Law force pair?
   1. The boy pulls the tree to the right and the tree pulls the boy to the left.
   2. The rope pulls the tree to the right and the tree pulls the rope to the left
   3. Gravity pulls the boy down and the normal force of the ground pushes the boy up
   4. Tension in the rope pulls the boy to the left and pulls the tree to the right.
2. Which of the following is NOT true for Newton's Third Law force pairs?
   1. The Forces are equal in magnitude
   2. The forces act on the same object
   3. The forces are opposite in direction
   4. The forces act at the same time
3. Which is an example of Newton’s Third Law?
   1. My brother hits me in the arm and I hit him back
   2. I throw a baseball and the baseball hits the wall
   3. A gun recoils as it shoots a bullet
   4. I stretch a rubber band and it shoots across the room
4. The white cue ball hits the eight ball, which is initially at rest. The cue ball stops and the eight ball is set into motion. Which statement is true?
   1. The eight ball exerts a greater force on the cue ball than the cue ball exerts on the eight ball
   2. The cue ball exerts a greater force on the eight ball than the eight ball exerts on the cue ball
   3. The cue ball exerts the same force on the eight ball as the eight ball exerts on the cue ball
   4. The relationship between the forces depends on the initial speed of the cue ball

**Long Answer. Answer the following questions, showing all work.**



1. A spring scale is attached to a heavy block. A string tied to the spring scale continues over a pulley to a hanging 0.5 kg mass. Using Newton’s Third Law force pairs, show that the reading on the scale is approximately 5 Newtons.
2. Instead of being attached to a heavy block, the same spring scale now has a string on either side, each continuing over a pulley to a hanging 0.5 kg mass. What is the reading on the spring scale? Explain your answer in terms of Newton’s third law.