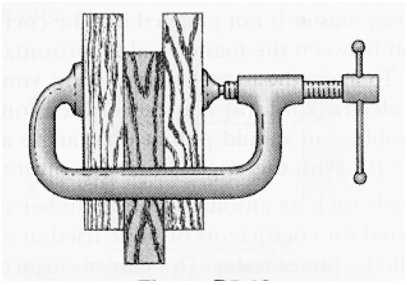
Name:_____

Solve the following problems in the space provided. Use the back of the page if needed. Each problem is worth 20 points. You must show your work in a logical fashion starting with the correctly applied physical principles. The equations you need are on the equation sheet. Your score will be maximized if your work is easy to follow because partial credit will be awarded.

1. A 100N board is sandwiched between to other boards using a clamp as shown. The clamp is very loose so that the board is just barely held in place. The coefficient of friction between boards is 0.875. (a)Draw the forces that act on the 100N board. (b)Find the magnitude of each force.



2. The moon is in a nearly circular orbit about Earth at a nearly constant speed. Describe the moon's motion from the point of view of each of Newton's Laws of Motion. For full credit you must be able to at least paraphrase each law.

3. Determine (a)the acceleration of the moon in its 27.4 day orbit around Earth and (b)the force that Earth exerts on the moon.

4. A woman at the airport pulls her 20.0kg suitcase, initially at rest, with a force of 60.0N at an angle of 60.0° above horizontal for a distance of 2.00m. The frictional force on the suitcase is 20.0N. Find (a)the work done by each force on the suitcase and (b)the speed of the suitcase at the end of the two meters.

5. In 1940, Emanuel Zacchini set the record for distance by a "human cannonball" at 53.0m. His mass was 65.0kg and his initial speed was 24.0m/s. He was launched at 30.0° above horizontal. Find his (a)initial kinetic energy, (b)speed at the top of his flight, (c)kinetic energy at the top of his flight, and (d)maximum height above the ground. You may assume that air resistance is negligible.