Name:

Mechanical Advantage = Out Put Force / In Put Force

**Solve each problem on the back of this page. SHOW YOUR WORK!**

1. —Calculate the MA of a machine that has an input force of 15N and an output force of 60N?   
  
2. —Suppose that with a pulley system you need to exert a force of 1,400N to lift a heavy object. But without the pulley system, you need to exert 4,200N to lift the object. What is the MA of the pulley system?   
  
3. —Amanda uses a wheelbarrow to lift a load of bricks. The bricks weigh 600 N, which is more than Amanda could normally carry. However, with the wheelbarrow, Amanda can lift the bricks with as little as 120 N. What is the mechanical advantage of the wheelbarrow?   
  
4. Marshall wants to remove a tree stump from the ground. To do this, he puts one end of a long beam under the stump and puts all of his weight on the other end. His weight is just enough to lift the stump. The stump weighs 400 N. Marshall weighs 250 N. What is the mechanical advantage of the lever Marshall is using?   
  
5a. A system of pulleys allows a mechanic to lift an 1800 N engine. .If the mechanic exerts a force of 600 N on the pulley system, what is the mechanical advantage of the machine?   
  
5b. After improving the design of his pulley system, the mechanic can now lift the engine with a MA of 4. How much force is now required to lift the engine?   
  
5c. What is the mechanical advantage of an engine crane if the mechanic must exert 800 N of force to lift the engine?

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