Calculating Mechanical Advantage

Directions : Use the provided background information to solve the math problems on the following page.

Background:
We use simple machines everyday to make work easier. We use inclined planes to lift heavy objects. We use screws such as car jacks to change flat tires. These machines are able to make work easier by multiplying the amount of effort put into them, also known as the **output force**. By multiplying the effort force, a simple machine is able to overcome the **input force**, or the force that opposes the effort force and the force of the machine. The number of times the machine multiplies the effort force is called its **mechanical advantage**. The most basic equation used to calculate mechanical advantage is as follows:

Mechanical Advantage = Output Force/ Input Force

We must now consider how to calculate mechanical advantage for each type of simple machine. Below are the equations needed to calculate mechanical advantage for each simple machine.

Lever: Mechanical Advantage = length of effort arm/ length of resistance arm

Pulley: Count the number of rope segments that exert an upward force on the object being moved.

Wheel and Axle: Mechanical Advantage = radius of wheel/radius of axle

Inclined Plane: Mechanical Advantage = length of slope/ height of slope
(Includes wedge height of slope and screw)