Ideal Mechanical Advantage Review

$$Ideal\ Mechanical\ Advantage = \frac{Output\ Force}{Input\ Force}$$

#1:

If you exert an input force of 40 N on a machine and the machine produces an output force of 20 N, what is the ideal mechanical advantage of the machine?

0.5

#2:

I requires a force of 120 N to lift a stack of bricks. Using a wheelbarrow, you only need to exert a force of 40 N. What is the ideal mechanical advantage of the wheelbarrow?

3

$$Efficiency = \frac{Output\ work}{Input\ work} \times 100\%$$

Will the fraction, *output work/input work,* ever equal a value higher than 1? Why or why not?

#1:
You do 1,500 J of work in using a hammer. The hammer does 825 J of work on a nail. What is the efficiency of the hammer?

55%

2:
You cut the lawn with a hand lawn mower. You do 250,000 J of work to move the mower. If the work done by the mower in cutting the lawn is 100,000 J, what is the efficiency of the lawn mower?

40%

$$IMA = \frac{\text{Length of Incline}}{\text{Height of Incline}}$$

$$IMA = \frac{\text{Distance from fulcrum to input force}}{\text{Distance from fulcrum to output force}}$$

How would you decrease the mechanical advantage of a first class lever?

Shorten the distance between the input force and the fulcrum.

$$IMA = \frac{\text{Radius of wheel}}{\text{Radius of axle}}$$

The ideal mechanical advantage of a pulley system is equal to the number of sections of rope that support the object. (*Don't include the rope on which you pull downward, because it does not support the object*.)