

What Effort must be used?

$IMA = \frac{EA}{RA} = \frac{6}{2} = 3$   
 $Effort \times IMA = Resistance$   
 $Effort \times \frac{3}{1} = \frac{100}{3} = 33.3 \text{ lbs}$

$IMA_{Lever} = \frac{Effort\ Arm}{Resistance\ arm}$   
 $Effort \times IMA = Resistance\ Force$   
 $IMA_{Wheel\ and\ Axle} = \frac{Diameter\ of\ what\ you\ turn}{Diameter\ of\ what\ gets\ turned}$   
 $IMA_{Ramp} = \frac{Length\ of\ Ramp}{height}$   
 $Pulley\ lift \times IMA = Pulley\ Pull\ distance$   
 $IMA_{Wedge} = \frac{Length}{width}$   
 $IMA_{Screw} = \frac{diameter \times \pi \text{ of Knob}}{Pitch}$   
 $Pitch = \frac{length}{\# \text{ Threads}}$   
 $lift \times IMA = How\ much\ pull$

What is the IMA of the wheel and axle below?  
Turn axle

$IMA = \frac{\text{what you turn}}{\text{what gets turned}} = \frac{1}{30} = .03\bar{3}$

Weight = 500N

What force to push the barrel up the ramp?  
 $IMA_{Ramp} = \frac{length}{height} = \frac{12}{2} = 6$   
 $Effort \times IMA = Resistance$   
 $Effort \times \frac{6}{1} = \frac{500N}{6}$   
 $Effort = 83.\bar{3} \text{ lb}$



