Simple Machines
Efficiency & Mechanical Advantage

Answer to practice Problems

Practice

You do 222 J of work pushing a box up a ramp. If the ramp does 200 J of work, what is the efficiency of the ramp?

W_o= 200 J ***W_i= 222 J***

***Efficiency* = (200 J/222 J) * 100**

***Efficiency* = 90.09%**

You do 1200 J of work with gears. If the gears do 1000 J of work, what is the efficiency of the gears?

***Efficiency* = (1000 J/1200 J) * 100**

***Efficiency* = 83.33%**

A 500-newton cart is lifted to a height of 1 meter using a 10-meter long ramp. The worker only has to use 50 newtons of force to pull the cart. What is the efficiency of the ramp?

W_o= (500 N)(1 m) = 500 J ***W_i= (50 N)(10 m)= 500 J***

***Efficiency* = (500 J/500 J) * 100**

***Efficiency* = 100%** **Ideal Machine**

Practice

A lever is used to lift a load weighing 200N. The force needed was 600N. What is the mechanical advantage of this first class lever?

F_o= 200 N ***F_i=600 N***

***Mechanical Advantage* = 200 N/ 600 N = 0.33**

A 500-newton cart is lifted to a height of 1 meter using a 10-meter long ramp. The worker only has to use 50 newtons of force to pull the cart. What is the mechanical advantage of the ramp?

F_o= 500 N ***F_i=50 N***

***Mechanical Advantage* = 500 N/ 50 N = 10**