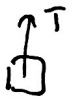
Classwork 1/27

1) A weight lifter lifts a set of weights a vertical distance of 2.0 m. If a constant net force of 350 N is exerted up on the weights?

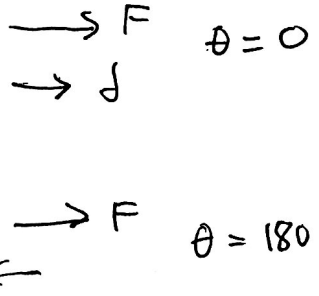
2) A shopper pushes a cart with a force of 35 N at an angle of 25° downward force from the horizontal. Find the work done on the cart if it is moved 50.0 m

3) Indicate whether the work done is positive or negative
   a) The road exerts a friction force on a speeding car skidding to a stop. 
   b) A rope exerts a force on a bucket that is raised up a well 

$$W = F d \cos\theta$$

Work = (Force)(distance) $\cos\theta$

θ is angle between force and distance

ex) 

Class work 1/30

1) Calculate the speed of an 8.0×10^4 kg airliner with a kinetic energy of 1.1×10^9 J

2) What is the speed of a 0.145 kg baseball if its kinetic energy is 109 J?

3) A pellet has a mass of 3.0 g & a speed of 10.0 m/s. How much kinetic energy does it have? (make sure you convert grams to kilograms)

4) A car has a kinetic energy of 4.32×10^5 J when traveling at a speed of 23 m/s. What is its mass?

measured in Joules

$KE = \frac{1}{2}mv^2$

kinetic energy $= \frac{1}{2}(\text{mass})(\text{velocity})^2$

'speed' & 'velocity' are used interchangeably.

Technically speed is a scalar

velocity is a vector

Class work 1/31

1) A student wearing frictionless inline skates on a horizontal surface is pushed by a 45 N constant force. The student starts from rest, how far must the student be pushed so that his final kinetic energy is 352 J

2) A 75 kg bobsled starts from rest and is pushed a distance of 4.5 m and has a final speed of 6.0 m/s. What is the magnitude of the net force on the bobsled?

$W = \Delta KE = KE_f - KE_0$

work = Change in kinetic energy

$KE = \frac{1}{2} mv^2$ $W = Fd\cos\theta$

Class work 2/1

1) A spoon is raised 0.21 m above a table. The spoon has a mass of 0.03 kg. How much potential energy does the spoon have with respect to the table?

2) A 77 kg diver drops from a board 10.0 m above the water's surface. What is the diver's velocity right before striking the water?

3) A pendulum bob is released from some initial height such that the speed at the bottom of the swing is 1.9 m/s. What was the initial height?

$$E_0 = E_f$$

initial energy = final energy

$$E = KE + PE$$

total energy = kinetic energy + potential energy

$$E_0 = E_f$$

$$KE_0 + PE_0 = KE_f + PE_f$$

$$PE = mgh$$

$g = 9.8\ m/s^2$ on earth

Potential energy = (mass)(acceleration due to gravity)(height)

$$KE = \frac{1}{2}mv^2$$

kinetic energy = $\frac{1}{2}$(mass)(velocity)^2

All energy is measured in Joules (J)