WS Stopping Distance **Physics**

Solve the following on a separate piece of paper using methods demonstrated in class. **BE SURE TO SHOW ALL WORK IN ORDER TO RECEIVE FULL CREDIT – Use method for *METHOD FOR SOLVING WORD PROBLEMS.***

1. A student wearing frictionless in-line skates on a horizontal surface is pushed by a friend with a constant force of 45 N. How far must the student be pushed, starting from rest, so that her final kinetic energy is 352 J?

$W = \Delta K$

$+F_A D = K_f - K_i$

$(45N)D = 352J - 0J$

$D = 7.8\,m$

2. A 2.0×10^3 kg car accelerates from rest under the actions of two forces. One is the forward force of 1140 N provided by the traction between the wheels and the road. The other is a 950 N resistive force due to various frictional forces. Use the work-kinetic energy theorem to determine how far the car must travel for its speed to reach 2.0 m/s.

$W_1 = +(1140N)\cdot D$

$W_2 = -(950N)\cdot D$

$K_i = 0J$

$K_f = \frac{1}{2}(2000kg)(2\frac{m}{s})^2 = 4000J$

$W = \Delta K$

$W = K_f - K_i$

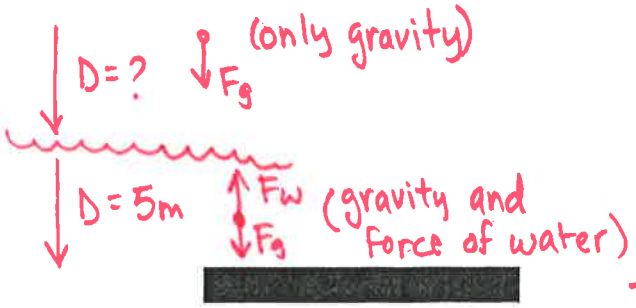
$W_1 + W_2 = K_f - K_i$

$(1140N)D - (950N)D = 4000J - 0J$

$(190N)D = 4000J$

$D = 21\,m$

3. A 50.0 kg diver steps off a diving board and drops straight down into the water. The water provides an upward average net force of 1500 N. If the diver comes to rest 5.0 m below the water's surface, what is the distance between the diving board and the diver's stopping point?



$F_w = 1{,}500N$

$F_g = (50kg)(9.8\frac{m}{s^2}) = 490N$

Below Water

$W = K_f - K_i$

$W_w + W_g = K_f - K_i$

$-F_w D + F_g D = 0J - K_i$

$-(1500N)(5m) + (490N)(5m) = -K_i$

$-5{,}050J = -K_i$

$K_i = 5{,}050J$ @ SURFACE OF WATER

Above water

$W = K_f - K_i$

$W_g = K_f - K_i$

$F_g D = K_f - K_i$

$(490N)D = 5{,}050J - 0J$

$D = 10.3m$