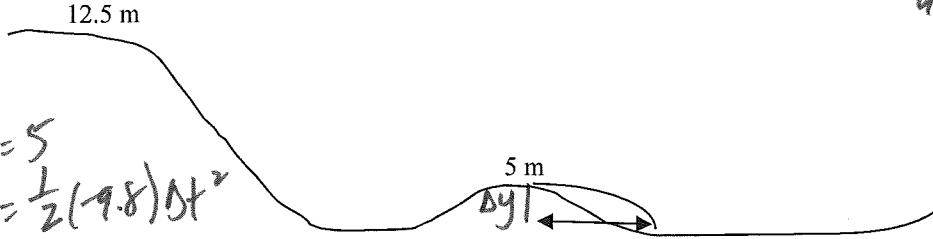


Target Day Practice QUIZ with Mrs. Benedict
Work/Power/Energy/Projectiles

key

1. A penguin is sliding down some hills on his tummy into the ocean for a swim. If he starts on the top of the 1st hill and leaves the 2nd hill as a horizontal projectile, **how far (Δx)** into the ocean will he land? (12.2 m)



① $gh_i + \frac{1}{2}v_i^2 = gh_f + \frac{1}{2}v_f^2$
 $9.8(12.5) = 9.8(5) + \frac{1}{2}v_f^2$
 $122.5 = 49 + \frac{1}{2}v_f^2$
 $73.5 = \frac{1}{2}v_f^2$
 $v_f = 12.12 \text{ m/s} = v_x$

② $\Delta y = 5$
 $-5 = \frac{1}{2}(-9.8)\Delta t^2$
 $\Delta t = 1.01 \text{ sec}$

③ $v_x = \frac{\Delta x}{\Delta t}$ $12.12 = \frac{\Delta x}{1.01}$ $= \boxed{12.2 \text{ m}}$

2. A 300 gram pendulum is released from an initial height of .50 m. How much **kinetic energy** will it have at the bottom of its swing? (1.47 J)

① $gh_i + \frac{1}{2}v_i^2 = gh_f + \frac{1}{2}v_f^2$
 $9.8(.5) = \frac{1}{2}v_f^2$
 $9.8 = v_f^2$
 $v_f = 3.13$

② $KE = \frac{1}{2}mv^2$
 $\frac{1}{2}(.3)(3.13)^2 = 1.47 \text{ J}$

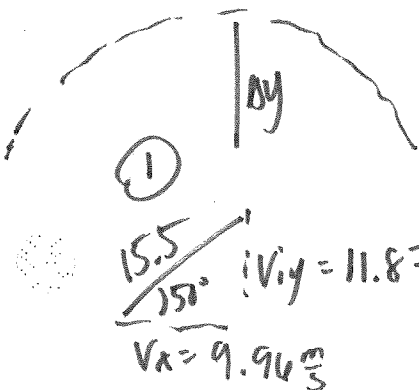
$300g \times \frac{1kg}{1000g} = 0.3 \text{ kg}$

3. A 2500 kg car accelerates from 0 to 25 m/s in 3.5 sec. What is the **horsepower** delivered by the engine? (299 hp)

$a = \frac{25-0}{3.5} = 7.14 \frac{m}{s}$
 $m = 2500 \text{ kg}$
 $\Delta x = v_i \Delta t + \frac{1}{2}a \Delta t^2$
 $\Delta x = 43.7 \text{ m}$

$P = \frac{m \cdot a \cdot d}{\Delta t} = \frac{2500(7.14)(43.7)}{3.5} = 222,870 \text{ W}$
 $\frac{222,870}{746} = \boxed{299 \text{ hp}}$

4. How much **potential energy** does a stomp rocket ($m=0.025 \text{ kg}$) have if it is released with a velocity of 15.5 m/s at a 50° angle? (1.77 J)



② $a_y = \frac{v_{fy} - v_{iy}}{\Delta t}$
 $-9.8 = \frac{-11.87}{\Delta t}$

$\Delta t = 1.21 \text{ sec}$

④ $PE = m \cdot g \cdot h$
 $(0.025)(9.8)(7.18 \text{ m}) = \boxed{1.76 \text{ J}}$

③ $\Delta y = v_{iy} \Delta t + \frac{1}{2}a_y \Delta t^2$
 $(11.87)(1.21) + \frac{1}{2}(-9.8)(1.21)^2$
 $14.36 -$
 $\Delta y = 7.18 \text{ m}$