Name Key Hour _____

1-Dimensional Motion PRACTICE QUIZ

Please attempt each problem to the best of your ability and **show your work**. Then grade your answers using the keys provided. Make sure you include a **UNIT on your answer**...it is worth ½ a point each time!

1. A student drops a ball from a window 3.5 m above the sidewalk. How fast is it moving when it hits the ground?

G- $\Delta y = -3.5m$, $V_i = 0$, $a = -9.8 m/s^2$

U- V_f

E- $V_f^2 = V_i^2 + 2a\Delta y$

$V_f^2 = 0 + 2(-9.8 m/s^2)(-3.5m)$

$V_f^2 = 68.6 m^2/s^2$

$V_f = 8.28 m/s$

2. A tennis ball is thrown straight up with an initial speed of 22.5 m/s.
   a. How long (Δt) does the ball take to reach the top of it flight?

G- $V_i = 22.5 m/s$, $V_f = 0$, $a = -9.8 m/s^2$

U: Δt

E: $a = \frac{V_f - V_i}{\Delta t}$

$-9.8 m/s^2 = \frac{0 - 22.5 m/s}{\Delta t}$

$\Delta t = \frac{-22.5 m/s}{-9.8 m/s^2} = 2.3 sec$

   b. How high does the ball rise?

U- Δy

E: $\Delta y = V_i \Delta t + \frac{1}{2} a \Delta t^2$

$\Delta y = (22.5)(2.3) + \frac{1}{2}(-9.8)(2.3)^2$ or

$51.75 + -25.92$

$\Delta y = 25.8 m$

$V_f^2 = V_i^2 + 2a\Delta y$

$0 = 22.5^2 + 2(-9.8)\Delta y$

$-506.25 = -19.6 \cdot \Delta y$

$\Delta y = 25.8 m$

3. A skater accelerates from rest to a speed of 5.1 m/s in 4.5 sec. What is the **total distance** traveled by the skater in **MILES**? solve a first!

G- $V_i = 0$, $V_f = 5.1 m/s$, $\Delta t = 4.5 sec$

U: a, Δx

(1) $a = \frac{V_f - V_i}{\Delta t}$

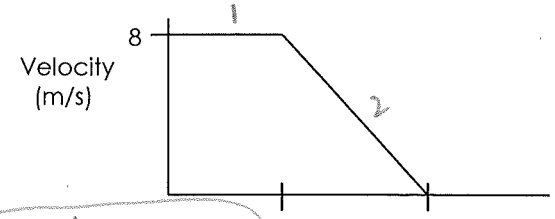
$a = \frac{5.1 - 0}{4.5} = 1.13 m/s^2$

(2) $\Delta x = \cancel{V_i \Delta t^0} + \frac{1}{2} a \Delta t^2$

$\Delta x = \frac{1}{2}(1.13)(4.5s)^2$

$\Delta x = 11.4m \times \frac{1 mi}{1609 m} = .007 mi$

4. Use the **velocity vs. time graph** to find the area under the graph. You can use shapes or 1-D motion equations.



area under graph = distance traveled!

What is the unit of the area? $\frac{m}{s} \cdot s = m$

(1) using shapes: $8 \times 10 = 80$ + $\frac{1}{2}(10)(8) = 40$ + $\rightarrow 120 m$

or equations

(2) segment 1: $V = \frac{\Delta x}{\Delta t}$ $8 = \frac{\Delta x}{10} = 80 m$

$a = \frac{0 - 8}{10} = \frac{8}{10} = .8$

segment 2: $V_f^2 = V_i^2 + 2a\Delta x$

$0 = 8^2 + 2(.8)\Delta x$

$\Delta x = 40 m$ + $\rightarrow 120 m$