Physics 112

Wednesday, October 11/17

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1. Return -> FA: Kinematic Equations (UAM)
2. Questions? Worksheet: Motion Problems
3. FA - Kinematic Problem
4. Ball Toss
5. Acceleration due to Gravity - To Be Continued

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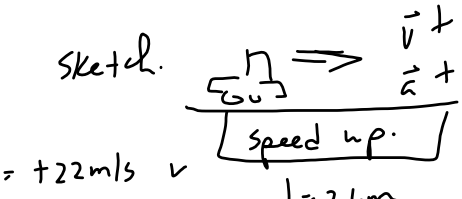
6. Freely Falling Bodies
7. Worksheet - Freely Falling Bodies

12. Sketch. 

$\vec{v}_i = +22\,m/s$ ✓

$\vec{a} = 14\,m/s^2$ ✓

$t = ?$

$\vec{d} = +26m$ ✓

$\vec{d} = \vec{v}_i t + \frac{1}{2}\vec{a}t^2$

$26 = 22t + \frac{1}{2}(14)t^2$

$26 = 22t + 7t^2$

$7t^2 + 22t - 26 = 0$

$ax^2 + bx + c = 0$

$a = 7, b = 22, c = -26$

$t = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$t = \frac{-(22) \pm \sqrt{22^2 - 4(7)(-26)}}{2(7)}$

$t = \frac{-22 \pm \sqrt{1212}}{14}$

$t = \frac{-22 \pm 34.8}{14}$

$t = \frac{-22 + 34.8}{14}$ or $t = \frac{-22 - 34.8}{14}$

$t = 0.91\,s$

OR

$\vec{v}_f^2 = \vec{v}_i^2 + 2\vec{a}\vec{d}$

$\vec{v}_f = \sqrt{\vec{v}_i^2 + 2\vec{a}\vec{d}}$

$\vec{v}_f = \sqrt{(22)^2 + 2(14)(26)}$

$\vec{v}_f = +34.8\,m/s$

$\vec{v}_f = \vec{v}_i + \vec{a}t$

$t = \frac{\vec{v}_f - \vec{v}_i}{\vec{a}}$

$t = \frac{34.8 - 22}{14}$

$t = 0.91\,s$

FA: Kinematic Equations (UAM)

1. $\vec{a} = \frac{\vec{v}_f - \vec{v}_i}{t}$

$\vec{v}_f = \vec{v}_i + \vec{a}t$

(slope)

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$v \cdot t$

2. $\vec{d} = \frac{1}{2}(\vec{v}_i + \vec{v}_f)t$

area

$v \cdot t$

$A = \frac{1}{2}(a+b)h$

3. $\vec{d} = \vec{v}_i t + \frac{1}{2}\vec{a}t^2$

4. $\vec{v}_f^{\,2} = \vec{v}_i^{\,2} + 2\vec{a}\vec{d}$

FA - Kinematic Problem (11/17)

A train brakes from 40 m/s to a stop over a distance of 100 m while travelling south. What is the acceleration of the train?

$\vec{v}_i = -40 m/s$

$\vec{v}_f = 0$

$\vec{d} = -100m$

$\vec{a} = ?$

$\vec{v}_f^{\,2} = \vec{v}_i^{\,2} + 2\vec{a}\vec{d}$

$0 = \vec{v}_i^{\,2} + 2\vec{a}\vec{d}$

$\frac{-\vec{v}_i^{\,2}}{2\vec{d}} = \frac{2\vec{a}\vec{d}}{2\vec{d}}$

$\vec{a} = \frac{-\vec{v}_i^{\,2}}{2\vec{d}}$

$\vec{a} = -\frac{(-40)^2}{2(-100)}$

$\vec{a} = +8.0 m/s^2$

→ The acceleration was $8.0 m/s^2$ N.

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Physics 122

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1. Questions?
   Worksheet - Physics Texts Problems - Relative Velocity

2. FA - Relative Velocity: Boat Problem

3. Type II: Velocities at Right Angles
   (ii) Intersection Problems

4. Worksheets - Relative Velocity (4)

Formative Assessment - Relative Velocity

Try: A catamaran whose speed in still water is 5.0 m/s heads west across an estuary. The current is 2.5 m/s south.

a) What is the velocity of the catamaran relative to the shore? Include a labeled sketch.

b) If the estuary is 2395 m wide, how long does it take the catamaran to cross the estuary?

Science 10

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1. SA - Chem #1 Intervention - After School Today

2. Roller Coasters

3. Single Replacement Reactions - P5

4. Double Replacement Reactions - P4

5. Worksheet: Single and Double Replacement Reactions

6. Combustion Reactions

7. Worksheet: Combustion Reactions