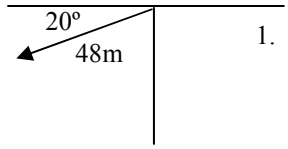
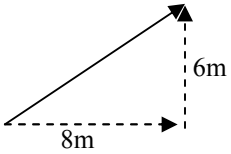
A-day: Due Fri., Sept 17
B-day: Due Mon., Sept 20

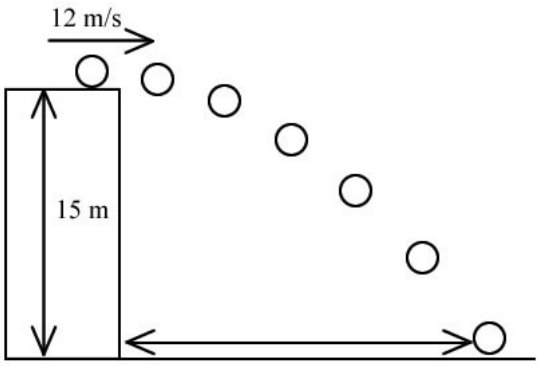
2010-11 PreAP Linear Motion 9



1. Calculate the x and y components of the 48 m vector.



2. Calculate the magnitude and direction of the triangle. (Hint: Use Tan.)



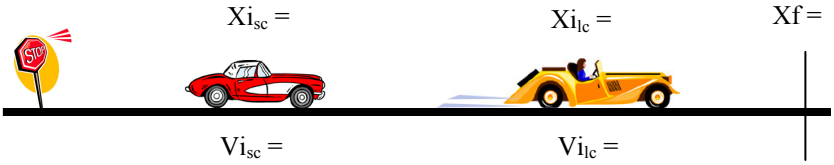
If need be, follow the way we did this on the previous homework. Try it without first, if possible.

3. An object is launched 12m/s horizontally from a 15 m tall cliff.
   A. Since the object is launched horizontally, what is the initial vertical velocity? Vi =
   B. a_y =
   C. Δy =
   D. Calculate the time for the ball to hit the ground.

   E. Since gravity is only in the y-direction, what is the x-direction acceleration? a_x =
   F. Vx = G. t_x =
   H. Calculate the distance in the x-direction.

Let's learn something new. See "Simultaneous Kinematic Equations" notes for help.
As I give information, put it on the diagram.

4. A sports car and a luxury car are "racing". The sports car is moving 30 m/s (V_{sc}) and starts 40 m to the right of a stop sign. The luxury car is only moving 20 m/s (V_{lc}) but starts 90 m from the stop sign. Where will the sports car pass the luxury car?



Since they are both at constant speed, you can use S = D/T or V = Δx/t, where Δx = Xfinal − Xinitial. Let's take the bar at the right of the page to be the crossing point, which will be the same for both cars. Xf will be one of your variables. Using V = Δx/t, set up the equations for both cars. Then you will have 2 equations and 2 variables. Solve for Xf.

5. A person is biking 8 m/s. When the bike passes a car, the car starts from rest and accelerates at 3 m/s. How long will it take for the car to catch the bike? (*Hint: you will have two equations, again, but you must use one of the kinematic equations for the car, because it is accelerating.*)

6. A rock is thrown down 6 m/s from the top of a 120 m tall building. How long will it take for the rock to hit the ground?

7. A car is accelerating and travels a displacement of 56 m in 3 seconds. What is its average velocity?

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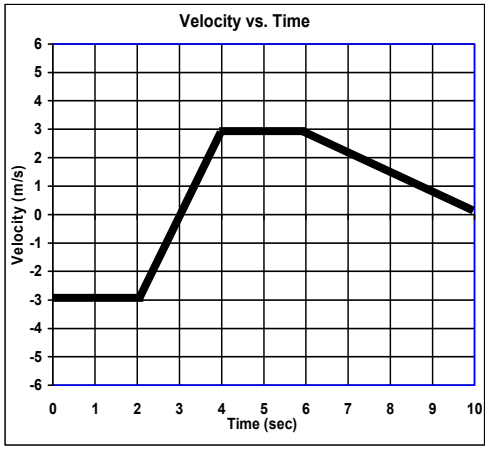


8. Translate the velocity graph to position and acceleration.

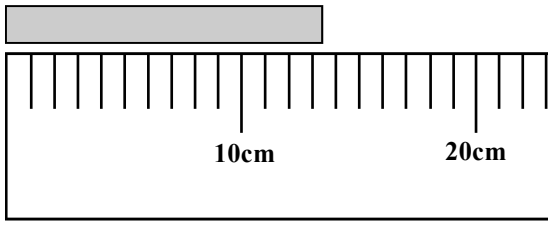
9. Zero or non-zero?

A. __ Vi when an object is dropped.
B. __ Acceleration when an object is thrown into the air.
C. __ Acceleration when at constant speed.
D. ____Vf at the top when an object is thrown into the air.
E. ____Acceleration at the top of an object's path.
F. ____Velocity when an object turns around.

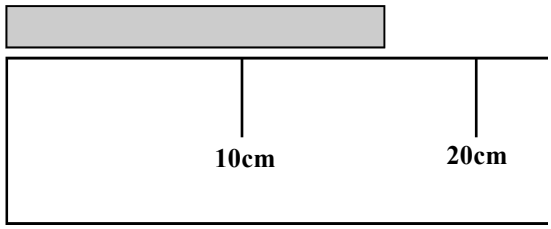
10. Which axis is the independent variable?
11. Which axis is the manipulated variable?
12. What is accuracy?
13. What is precision?

14. Measure the two objects below with the correct number of significant figures.

A.

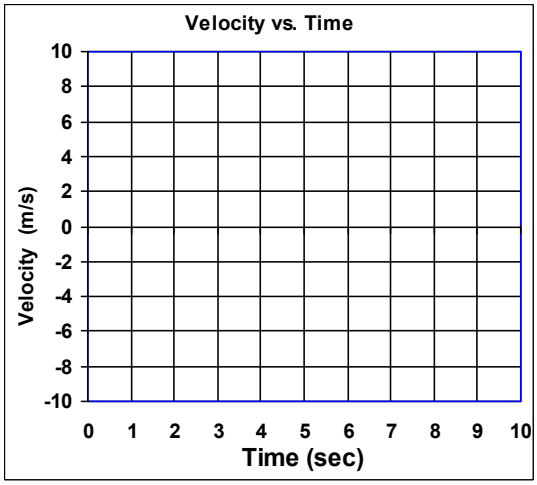


B.



15. An object moves 4 m/s for 3 seconds, then accelerates at 1 m/s^2 for 4 seconds. Then the object moves at a constant 8 m/s for 3 seconds. Graph this motion on the graph at the right.

16. Have your acceleration lab done and ready to grade.



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