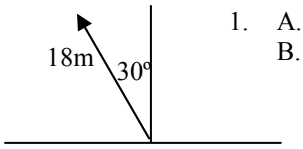
A-day: Due Mon., Sept 13
B-day: Due Tues., Sept 14

2010-11 PreAP Linear Motion 7



1. A. What direction will you use for the 18m displacement?
   B. Calculate its x and y components.

Remember that if there is an acceleration or (if the object changes speed) you must use one of the kinematic equations. If the object is at constant speed (acceleration = 0) you can just use S = D/T. (*And we will practice with a different speed unit.)*

2. An object moves to the right at 12 cm/sec for 3 seconds. Then the object moves to the left at 4 cm/sec for 2 seconds.
   A. What is the object's displacement in the first 3 seconds?

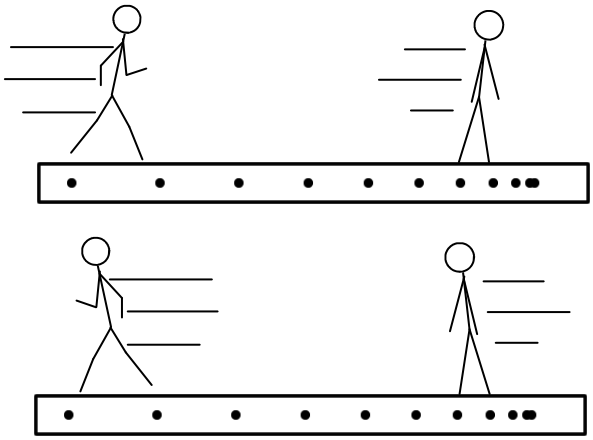
   B. What is the object's displacement in the last 2 seconds?

   C. What is the object's total displacement (how far is it from its initial position)?

   D. Since average velocity is displacement over time, what is the average velocity of the whole trip?

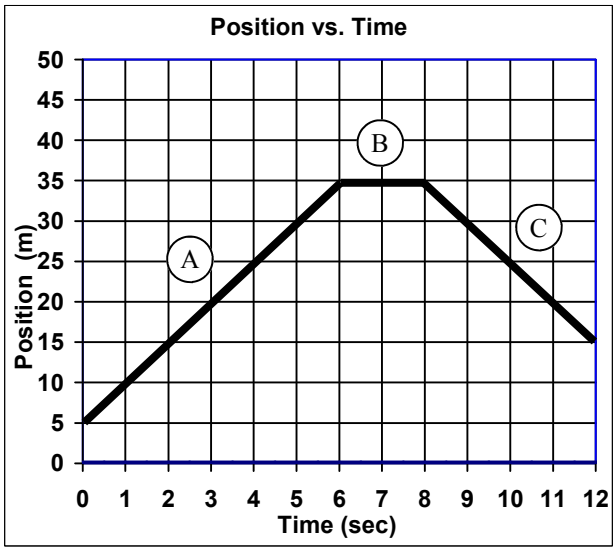
   E. What is the total distance the object traveled?
   F. Speed is D/T. What is the average speed of the object during the trip?

3. Notice the diagrams at the right.
   A. In the top diagram, is Slim Jim speeding up or slowing down?
   B. Is his velocity becoming more or less positive?
   C. Is his acceleration is positive or negative?
   D. After he turns around, does he speed up or slow down?
   E. Is his velocity becoming more or less negative?
   F. Is his acceleration positive or negative?



4. A ball is thrown into the air.
   A. On the way up, does it speed up or slow down?
   B. Is that a positive or negative acceleration?
   C. On the way down, does it speed up or slow down?
   D. Is that a positive or negative acceleration?

5. An object is moving to the left and has a positive acceleration.
   A. Is it speeding up or slowing down?
   B. Does the distance it travels each second increase or decrease?



Remember: displacement between 2 position is the difference: final position − initial position ($x_f - x_i$). *You don't care about the path in between displacements, only the end points.*

6. A. What is the average velocity of the object during the first 6 sec?

   B. What is the displacement of the object for the first 8 seconds?

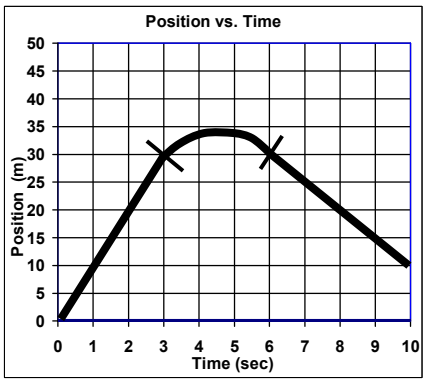
   C. What is the average velocity for the first 8 seconds?

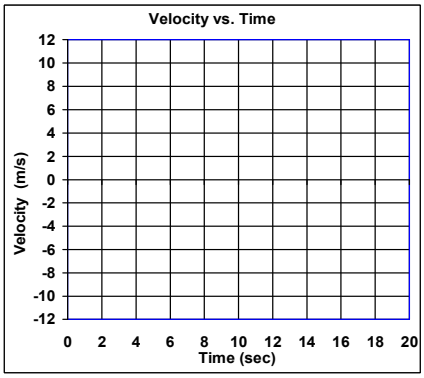
   D. What is the average velocity of the entire graph?

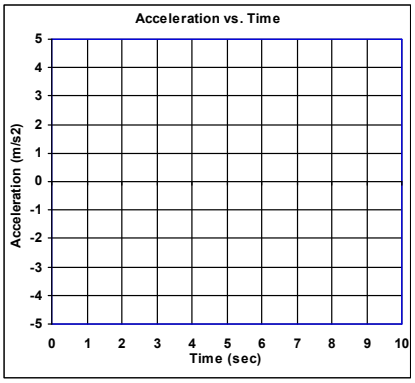
7. An object is dropped from 18 m in the air. Calculate how long it takes to hit the ground. (*You have enough info.)*

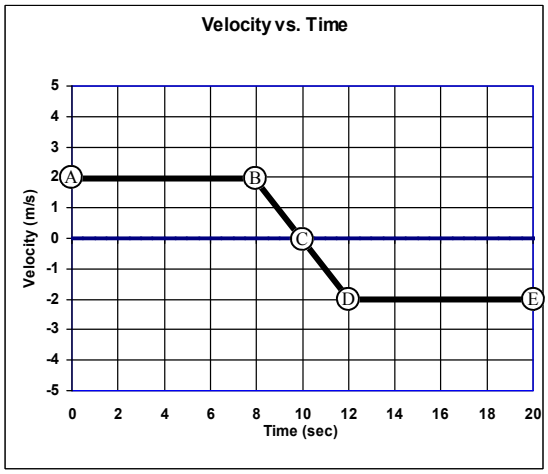
8. An object at rest begins to accelerate to the left. It travels 112 m to the left in 14 seconds. Calculate final velocity.

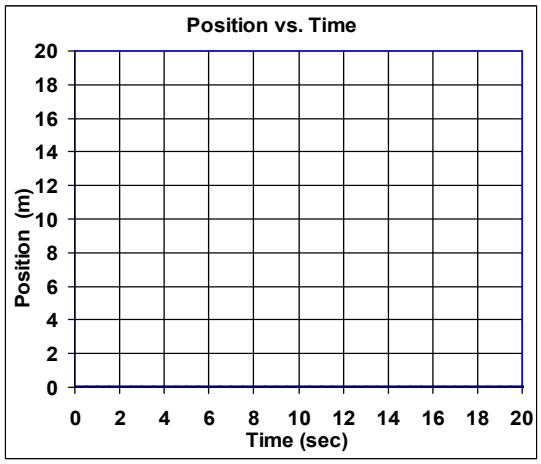
9. Do this exactly as I describe it:
   A. On the position graph, calculate the slope of the first and third line segment and graph them on the velocity graph.
   B. Since you can't easily calculate the changing slope of the middle part, just connect the first and third segments on the velocity graph with a straight line.
   C. Calculate the slopes of each of the three segments on the velocity graph and transfer them to the acceleration graph.











As we discovered in the last homework, the area between the line and the x-axis is the displacement of the object.

10. A. From A to B calculate the displacement (area) of the object.

    B. From B to C calculate the displacement (area of the triangle).

    C. What is the total from A to C?
    D. Calculate the displacement from C to D. It will be negative.

    E. Calculate the displacement from D to E (also negative).

    F. What is the total from C to E?
    G. Fill in the table, starting at 0 m and adding and subtracting the displacements you found above.

Point	Time	Position
A	0 sec	0 m
B	8 sec	
C		
D		
E		

Follow my instructions carefully.

    H. Draw dots to show where the object is on the position graph.

    I. You should know that for two of the times the object was moving at constant speed. Use straight lines.

    J. For the acceleration portion make sure to pass thru the dots and use a curve. (*Hmmm Q9 could help*.)