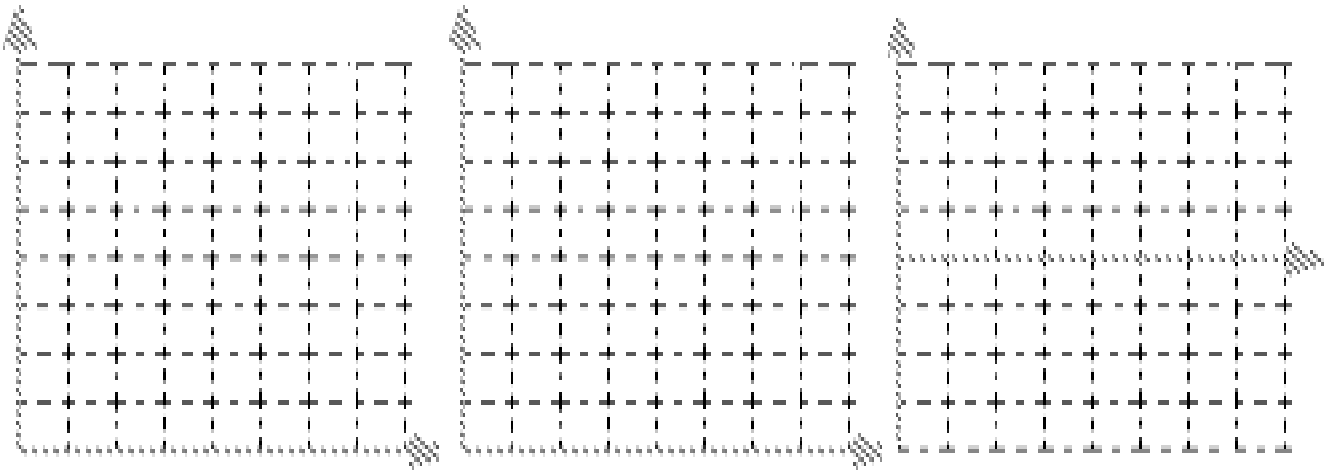
Name_____

Date_____Pd____

UNIT III: Worksheet 1

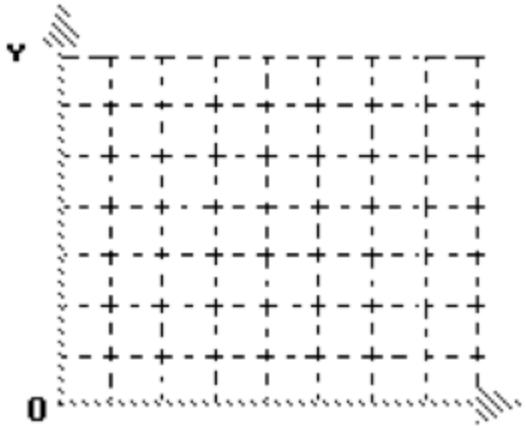
While cruising along a dark stretch of highway with the cruise control set at 25 m/s, you see that a bridge has been washed out. You apply the brakes and come to a stop in 4.0s. *Assume the clock starts the instant you hit the brakes and this is the zero position. Assume also that you are moving in a positive direction.*

1. Construct **qualitative** graphical representations of the situation described above to illustrate:
   a. **x** vs. **t**
   b. **v** vs. **t**
   c. **a** vs. **t**



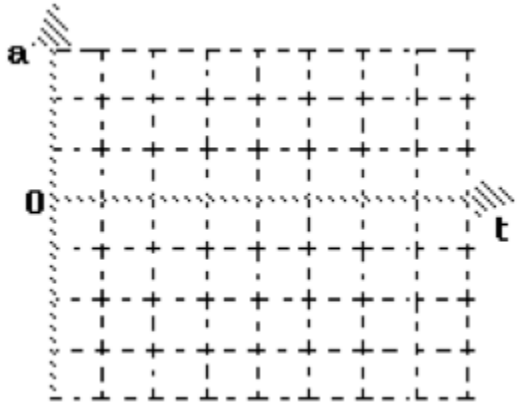
2. Construct a **quantitatively accurate v** vs **t** graph to describe the situation.

3. On the **v vs t graph** at the right, graphically represent the car's displacement during braking. What is this shape? What is the formula for the area of this shape?



4. How far did the car travel during braking? Show all work.

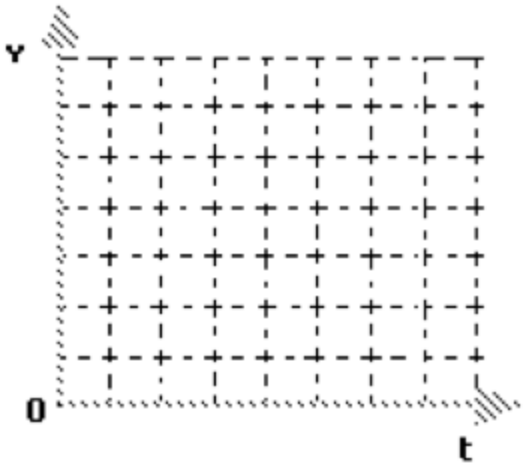
5. In order to draw the **a** vs **t** graph, you need to determine the car's acceleration. Please do this, then sketch a **quantitatively accurate a** vs **t** graph. Show all work.



This time, while cruising along a dark stretch of highway at 30 m/s, it takes you 0.5 s to react, then you apply the brakes and come to a stop 3.5 s later. *Assume the clock starts the instant you see the hazard.*

6. Construct a **quantitatively accurate v** vs **t** graph to describe the situation.

7. On the **v vs t graph** at the right, graphically represent the car's displacement during this incident. How is the shape different from the shape of the previous problem?



8. Utilizing the **graphical representation,** determine how far the car traveled during braking. Please explain your problem solving method.

9. Two kinds of motion occur in this case. For the first 0.5 s, the car is traveling at constant velocity. For the remainder of the time, the car has an initial velocity and a uniform acceleration. Using the appropriate mathematical model *for each phase of the motion,* determine how far the car traveled from the instant you noticed the hazard until you came to a stop. As always, show work and include units.

From t = 0s to t = 0.5 s

From t = 0s to t = 4 s

Total Displacement for t = 0s to t = 4 s