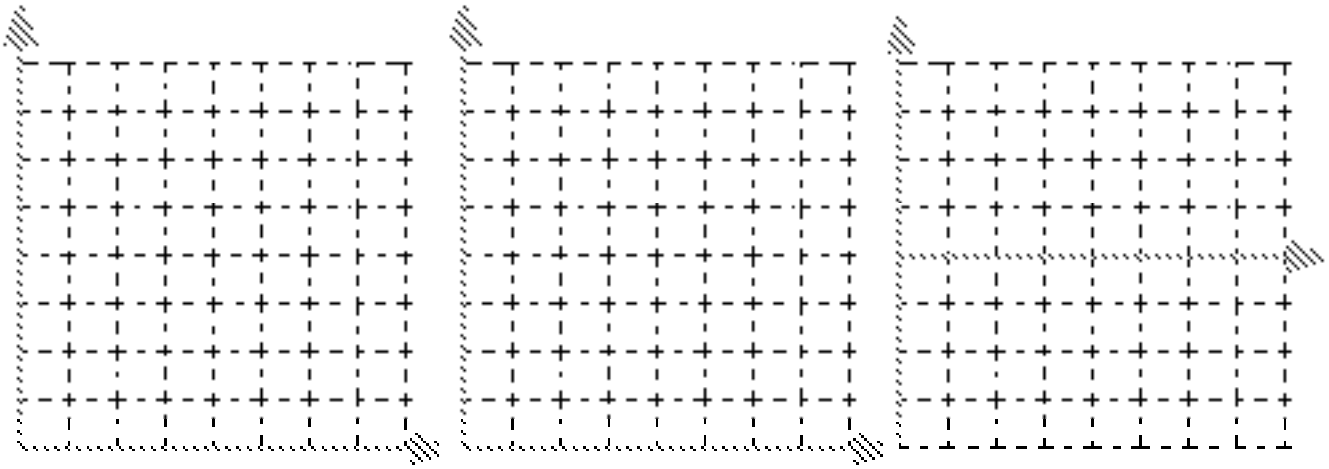
Name _____Period _____ Date _____

UNIT 1: WORKSHEET 7

While cruising along a dark stretch of highway with the cruise control set at 25 m/s (≈55 mph), you see, at the fringes of your headlights, 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 the origin is the location of the car when you hit the brakes.*

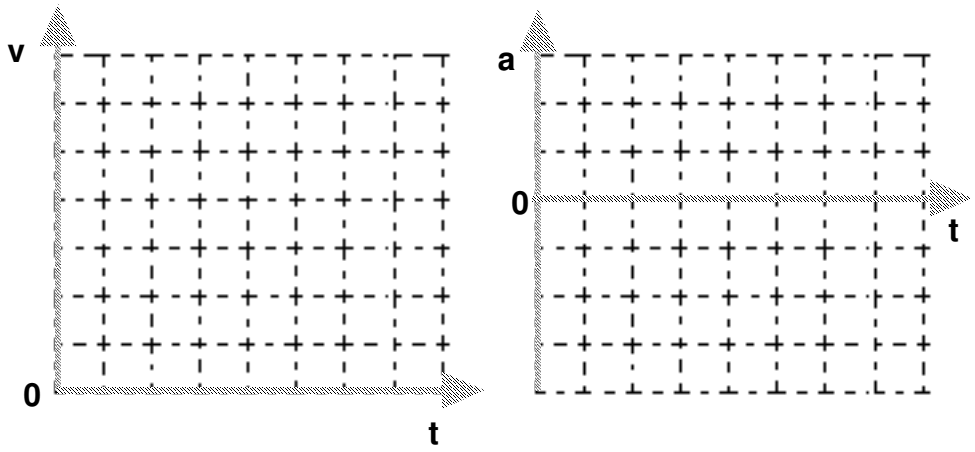
1. Construct **qualitative** graphical representations of the situation described above to illustrate:
   a. **x** vs. **t**
   b. **v** vs. **t**
   c. **a** vs. **t**

   Be sure to label the axes of the graphs.



2. Construct **quantitatively accurate** graphical representations of the situation described above for:

   a) **v** vs. **t**
   b) **a** vs. **t**



3. On the **v** vs **t** graph above, graphically represent the car's displacement during braking.

4. Utilizing the **graphical representation**, determine how far the car traveled during braking.

5. Did the car, according to your graph, have a constant acceleration after the brakes were applied? Please explain how you know.

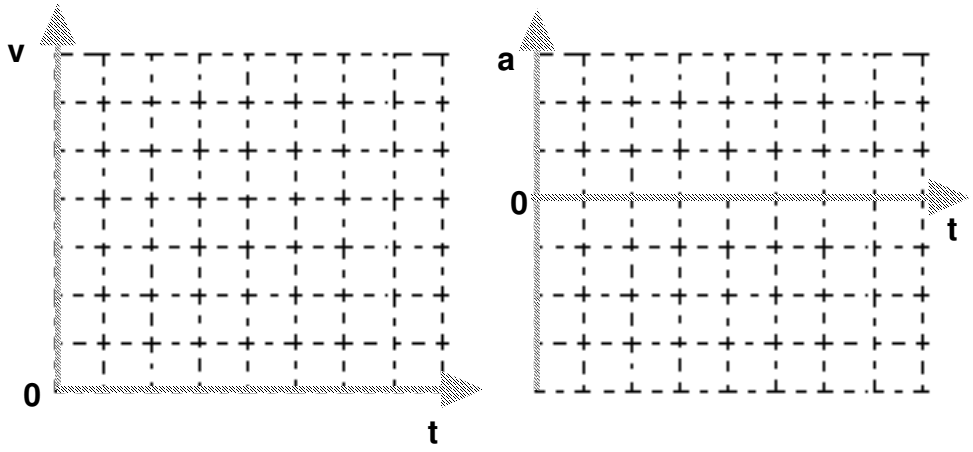
6. From the **v** vs **t** graph, determine the acceleration of the car once the brakes were applied. (Please show your work)

7. Using a **mathematical representation** (equation) determine how far the car traveled during braking. (Show your work.)

This time, while cruising along a dark stretch of highway at 30 m/s (≈65 mph), you see, at the fringes of your headlights, some roadkill on the highway. It takes you 0.5 s to react, then you apply the brakes and come to a stop 3.5s later. *Assume the clock starts the instant you see the hazard.*

8. Construct **quantitatively accurate** graphical representations of the situation described above for:

   a) **v** vs. **t**
   b) **a** vs. **t**



9. On the **v** vs **t** graph above, graphically represent the car's displacement during the entire 4.0 s interval.

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

11. From the **v** vs **t** graph, determine the acceleration of the car once the brakes were applied. (Please show your work)

12. Two kinds of motion occur in this case. For the first 0.5s, 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 representation *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.