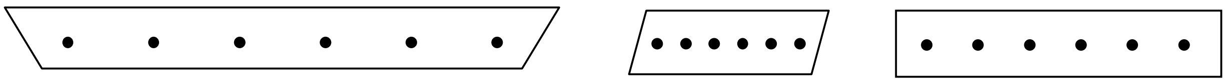
Tutorial 1 Homework Name ____________________________

The meaning of speed Tutorial section________________

I. Graphs and paper segments

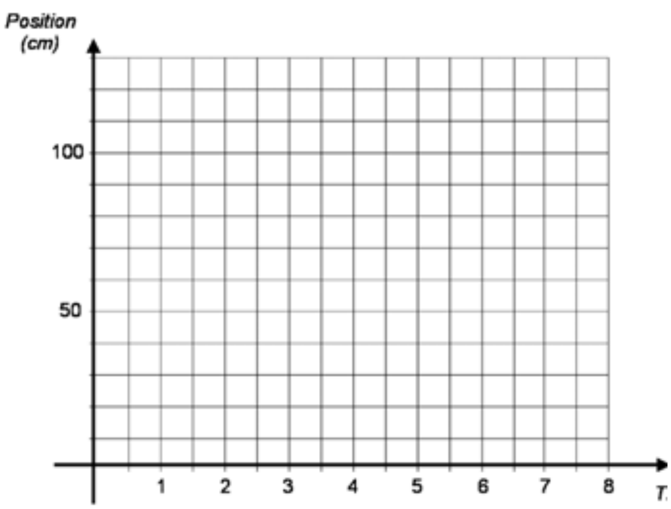
Below are life-size images of three segments of paper ribbon like those you used in tutorial. (Segments like these are generated by attaching a paper ribbon so that it drags behind a cart and through a tapping device; the tapper leaves dots as it taps on the ribbon at a constant rate, every $1/40^{th}$ of a second.)

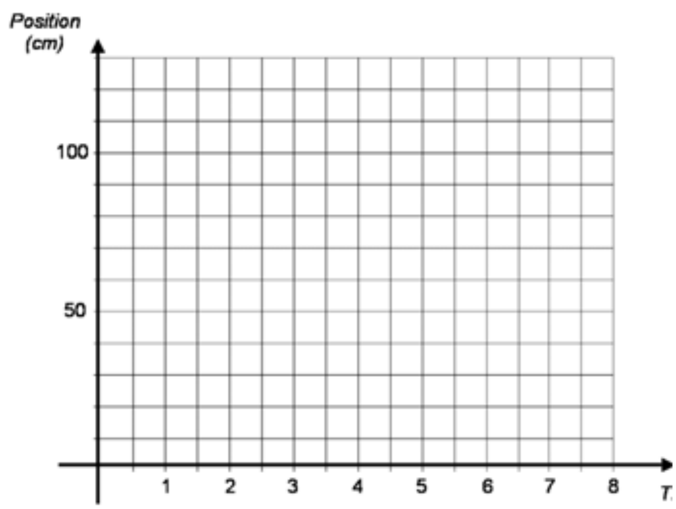


A. Use a ruler to determine the speed of the object that generated each of the paper segments (in cm/s). Write each speed under the corresponding image above.

B. On the position-time graph below left, graph the motion of the object that generated each segment assuming overall uniform velocity. Match each segment to its place on the graph. (There are many possible correct graphs.)

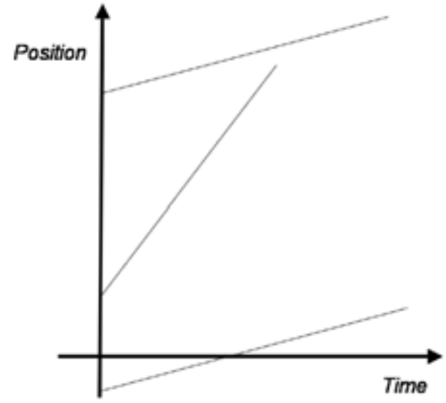
C. On the position-time graph below right, graph the motion of the object that generated the segments assuming that all three segments are part of the same overall motion. Match each segment to its place on the graph. (Again, there are many possible correct graphs.)





D. On the position vs. time graph at right:

1. What do the three different lines represent?



2. What is the interpretation of the slope of each line?

3. What is the interpretation of the intercept of each line (the place where it crosses the vertical axis)?

II. Reversals

In tutorial, the object that generated your paper ribbon always stayed on one side of the tapping device, so its position would always be recorded as positive. If it could go *behind* the tapping device, its position would become negative. For instance, a position $x = -2$ meters means you're 2 meters behind the tapper instead of 2 meters in front of it.

A. At which of the lettered points on the graph below:

- is the motion slowest?
- is the object speeding up?
- is the object slowing down?
- is the object turning around?

B. A common mistake is to say the person reverses direction at point E. Why do you think a student might make that mistake? What might you say to the student to help him avoid that mistake in the future?