Study Guide

AP Physics 1   **Mr. Butler**

Rectilinear Kinematics I

The student should know or be able to do the following:

1. Discuss the importance of identifying reference frames in order to describe motion and explain why all motion is relative.

2. Draw and identify coordinates axes within a reference frame for one-dimensional motion and identify the one-dimensional direction of motion within a reference frame.

3. Identify and define the quantities of motion and distinguish which are *vectors* and which are *scalars.*

4. Distinguish *distance* and *displacement*; using the correct equation to calculate them.

5. Distinguish *average velocity* and *average speed* and be able to calculate each using the quantities of displacement and distance.

6. Describe the difference between *average velocity* and *instantaneous velocity* and be able to explain how to determine each by graphical methods.

7. Correctly apply the basic equations that are used to describe one-dimensional linear motions to solve a variety of level one and two motion problems.

8. Correctly interpret ticker-tape/oil-drop data to explain and describe the rectilinear motion of objects using the defined quantities of motion.

9. Distinguish *velocity* from *acceleration* and be able to explain, in terms of directional vectors, what causes an object to speed up or slow down.

10. Correctly interpret the signs of positive (+) and negative (-) on motion quantities as directional orientation and not increases or decreases in quantity magnitudes.

11. Interpret and describe rectilinear motion from analyzing motion diagrams and *x, v* and *a* graphs and apply the skills of graphical analysis to draw motion diagrams and *x, v* and *a* graphs for a given rectilinear motion description.

12. Describe the difference between *scalar* and *vector* quantities and be able to identify which of the motion quantities are of which type (scalar or vector).

13. Be able to interpret which quantities the slope and area under the curve represent on different motion graphs.