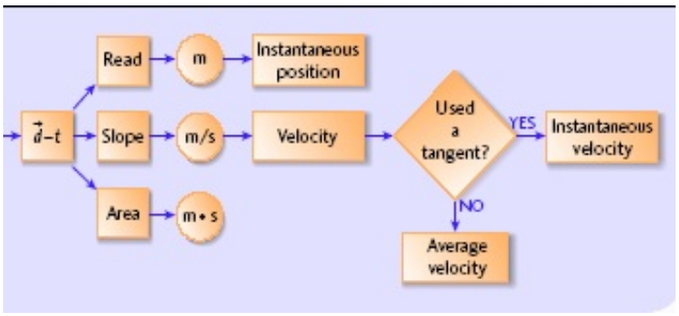
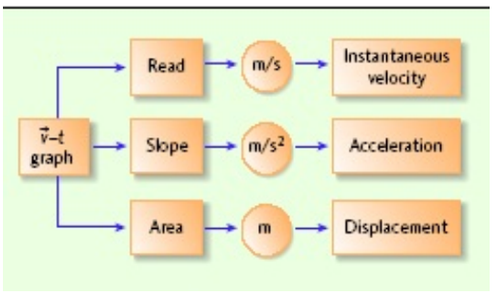
PHYSICS 3204

Unit 1: Vector Kinematics

Kinematics.	is the study of how objects move
Uniform Motion	refers to motion at a constant speed in a straight line.
Non Uniform Motion	refers to an object accelerating (speeding up, slowing down or changing direction
Overview of $\vec{d}-t$ graph	
Overview of $\vec{v}-t$ graph	
Scalars	Quantities that indicate 'size' or Magnitude. (ex speed, distance, time...)
Vectors	quantities that have both magnitude and directions (velocity, displacement, accleration..)
Distance:	A scalar quantity which refers to "how much ground an object has covered" during its motion.
Displacement	A vector quantity"how far out of place an object is"; it is the object's change in position. Note, a round trip has a displacement of zero
Average Speed	$V_{ave} = \frac{Total\ distance}{Total\ time}$ When dealing with uniform motion that has different speeds at different times, you can not determine the overall average speed by average the speed over the different times.
Average Velocity	$\vec{v}_{ave} = \frac{displacement}{time}$
Acceleration	vector quantity which is defined as "the rate at which an object changes its velocity." An object is accelerating if it is changing its velocity. $\vec{a} = \frac{\Delta \vec{v}}{t} = \frac{\vec{v}_2 - \vec{v}_1}{t}$ RULE OF THUMB If an object is slowing down, then its acceleration is in the opposite direction of its motion.

Kinematics Formula	These formulae are used for an object undergoing uniform acceleration. $v_2 = v_1 + a\Delta t$ $\Delta d = v_2 \Delta t - \frac{1}{2} a \Delta t^2$ $\Delta d = \frac{1}{2}(v_2 + v_1)\Delta t$ $v_2^2 = v_1^2 + 2a\Delta d$ $\Delta d = v_1 \Delta t + \frac{1}{2} a \Delta t^2$
Acceleration due to gravity	Objects that are dropped close to the earth accelerate downward at 9.81 m/s^2 (-9.81 m/s^2). The value 9.81 m/s^2 is acceleration due to gravity Note: It does not depend on the objects mass
Relative motion	**Inertial frame of reference** has a constant velocity. That is, it is moving at a constant speed in a straight line, or it is standing still. **Frame of reference:** a frame of reference is a place from which motion is observed. **Reference point**: is the position where you are standing. There are three ways to solve one dimension relative motion problems Method I: The doing it in your head method Method II: The vector diagram method Method III: Using a nemonic method