PHYSICS **Name:**

Kinematics of Motion in 1D

Summary of formulas:

$\mathbf{a}$ =	$\mathbf{v}$ =	$\mathbf{x}$ =
$\mathbf{v}_{av}$ =	$\mathbf{v}^2$ =	$\mathbf{x}$ =

Things to remember:

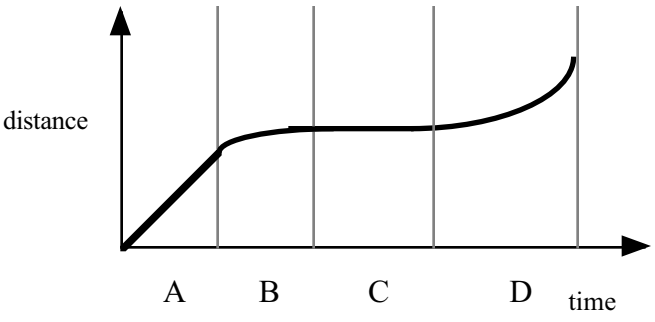
- "from rest" means $\mathbf{v}_o = 0$.
- $\mathbf{v}$ at top of projectile's path is 0.
- during free fall $\mathbf{a} = 9.81$ m/s^2 down.
- the above equations are only true for _____ _____ .

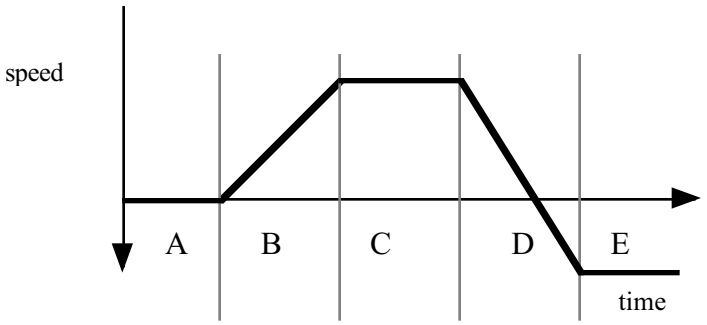
1. A spacecraft can be accelerated from 200.0 km/h to 350.0 km/h in 10.0 s. What is it's acceleration? (can you find $\mathbf{a}$ in m/s^2 squared?)

2. A car accelerates from a stop light for 20.0 s with an acceleration of 5.0 mph/s. Find its velocity at the end of this time. How far has it travelled?

3. A 747 airliner needs to achieve a speed of 360 km/h to take off. If acceleration is uniform and the runway is 1.8 km long, what acceleration is needed?

4. Examine the graphs below and describe the object's motion on each interval.





5. A penny is dropped from a building rooftop and takes 6.0 s to hit the ground. What velocity does it hit the ground with? How tall is the building in meters? in feet? How would this change if you accounted for the speed of sound?