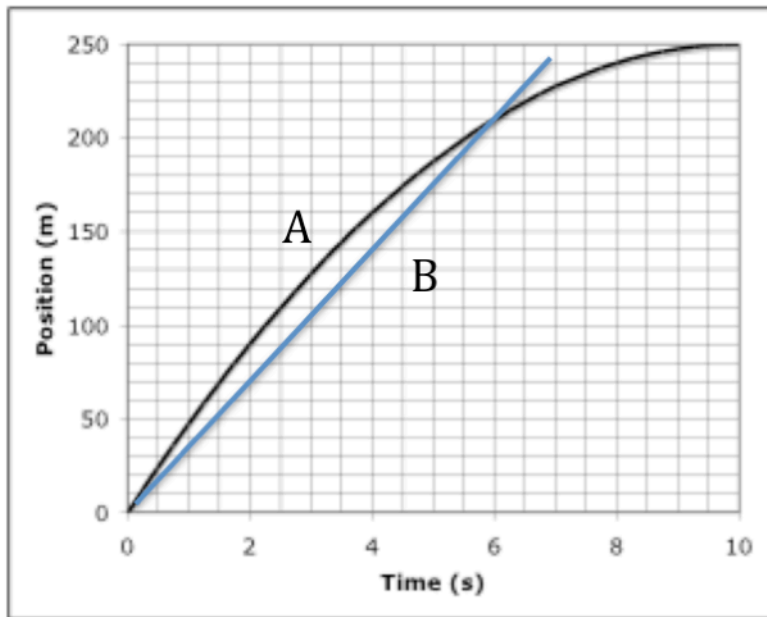


UNIT III: Practice Test

1. Consider the position vs time graph for objects A and B below.



*Equations you may
or may not need*

$$x_f = vt + x_i$$

$$\Delta x = x_f - x_i$$

$$\Delta x = vt$$

$$\Delta x = \frac{1}{2} vt$$

$$\Delta x = \frac{1}{2} at^2 + v_i t$$

$$v = \frac{\Delta x}{\Delta t}$$

$$v_f = at + v_i$$

$$\Delta v = v_f - v_i$$

$$v_f^2 = v_i^2 + 2a\Delta x$$

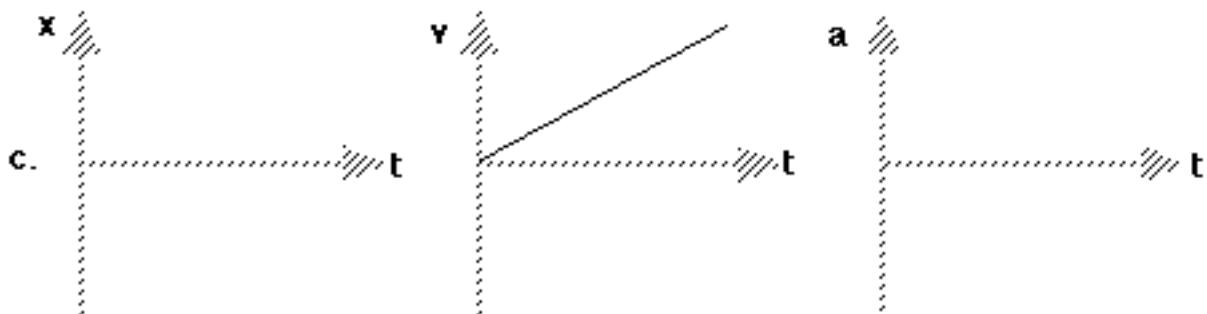
$$a = \frac{\Delta v}{\Delta t}$$

Displacement at $t = 6\text{ s}$ for each object:

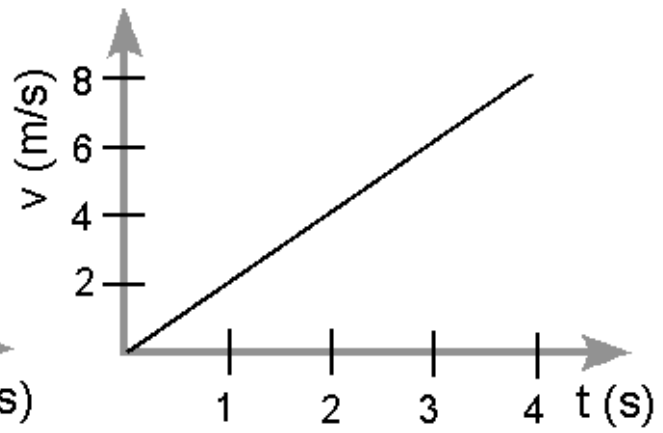
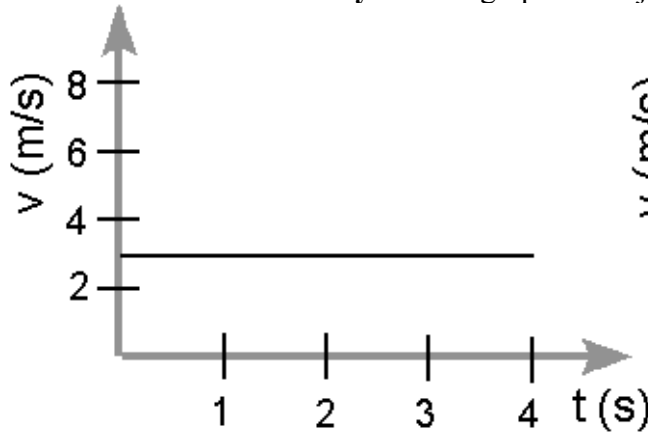
Ave. velocity from $t = 0\text{ s}$ to $t = 6\text{ s}$ for each object:

Instantaneous velocity at $t = 6\text{ s}$ for each object:

2. Complete the kinematics graphs below from the information given:



3. Consider the **velocity** vs time graph for objects A and B below.



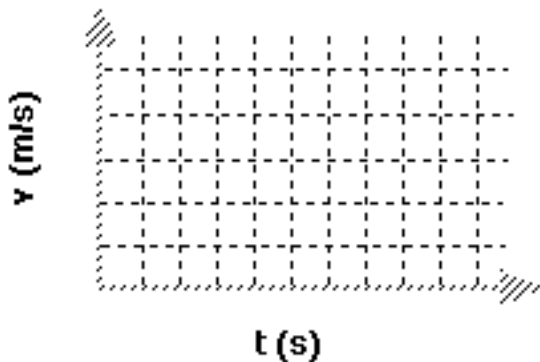
What is the displacement after 3 seconds for each object? Show your work.

Average Velocity after 3 seconds? Show your work.

Acceleration after 3 seconds? Show your work.

4. A plane touches down on the runway with an initial velocity of 100. m/s and comes to a stop 20 seconds later. It slows at a constant rate.

a. Sketch a **quantitative** velocity vs time graph to represent the motion of the plane.



b. What is the acceleration of the plane? Show work.

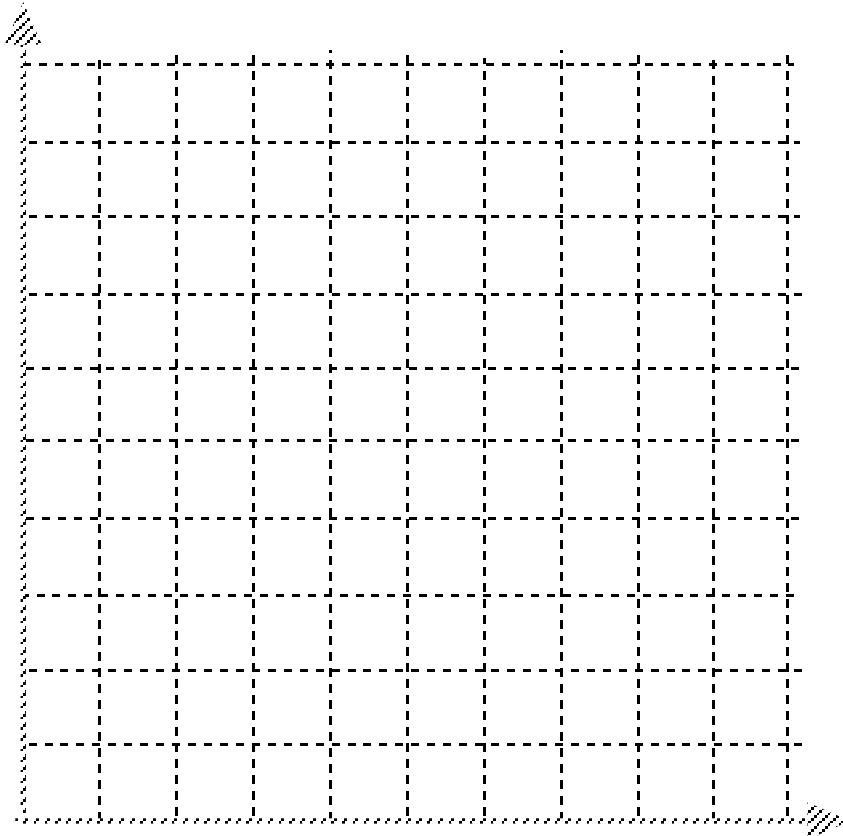
c. How far will the plane travel in these 20 seconds?

e. Using the appropriate model (not the graph), how fast will the plane be going 3.0 seconds after it puts on the brakes?

5. A group of physics students collect position time data as they roll a tire down a hill. The data they collect are below.

Time (s)	Position (m)
0	0
2	2
4	8
6	18
8	32
10	50

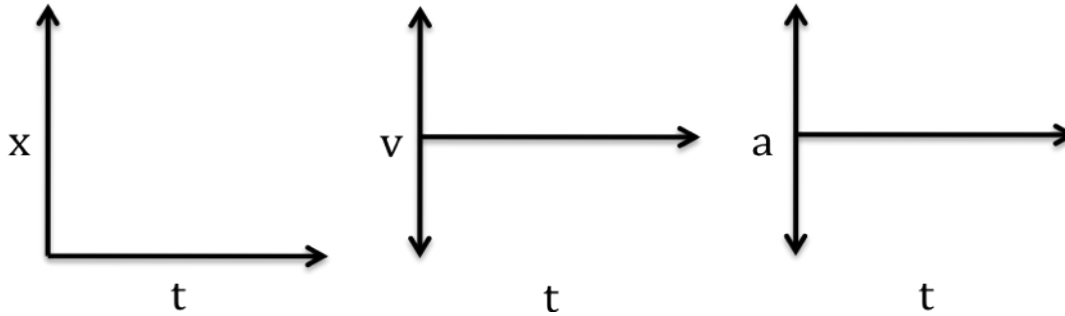
- a. Plot the position vs time for the object on the graph below. Sketch the curve. **Label the axes clearly!**



- b. Determine the **instantaneous** velocity at $t = 4$ s. Show your work.
- c. What is the acceleration from 0 to 4 seconds. Show your work.
- d. How fast will the object be moving at $t = 12.0$ s? Show your work.

6. Two objects are in free-fall on earth. One has a mass of 1 kg, the other has a mass of 1.5 kg. Consider air resistance to be negligible.

a. Draw qualitative position-time, velocity-time and acceleration-time graphs for the objects.



b. How far will each object fall after 10 seconds?

c. How fast will they be travelling at 7 seconds?

d. How long will it take for them to fall -200 m?

e. How fast will they be going after falling -30 m?

7. Two objects are free-falling on earth. Object A has a mass of 1 kg, Object B has a mass of 1000 kg. Both objects fall until they reach terminal velocity. Air resistance is NOT negligible. Compare each quantity below. Answer each statement as $A < B$, $A > B$ or $A = B$.

	Comparison: is $A > B$, $A < B$, or $A = B$,	How do you know?
a. acceleration		
b. Force of Earth		
c. Force of Air Resistance		
d. terminal velocity		