Review:

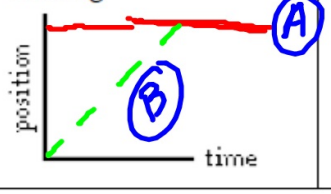
1. Categorize the following motions as being either examples of + or - acceleration.
   a. Moving in the + direction and speeding up (getting faster) ___+___
   b. Moving in the + direction and slowing down (getting slower) ___−___
   c. Moving in the - direction and speeding up (getting faster) ___−___
   d. Moving in the - direction and slowing down (getting slower) ___+___

Direction	Speeding ↑ or ↓	Acceleration
+	↑ (+)	+
+	↓ (−)	−
−	↑ (+)	−
−	↓ (−)	+

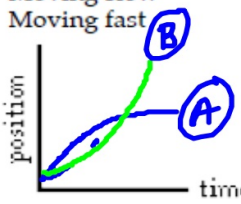
Interpreting Position-Graphs

2. On the graphs below, draw two lines / curves to represent the given verbal descriptions; label the lines / curves as A or B.

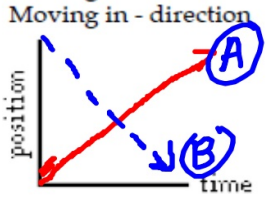
A Remaining at rest
B Moving



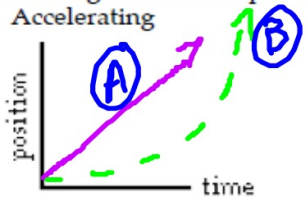
A Moving slow
B Moving fast



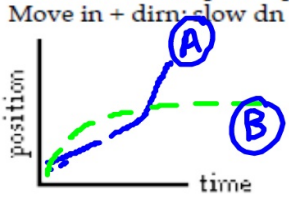
A Moving in + direction
B Moving in - direction



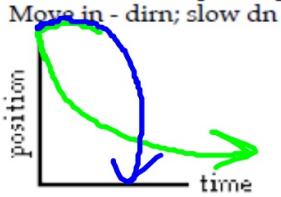
A Moving at constant speed
B Accelerating



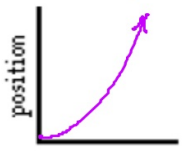
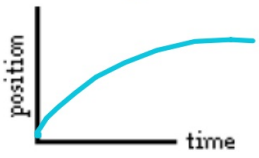
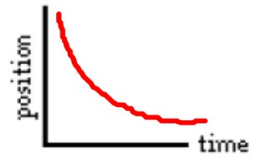
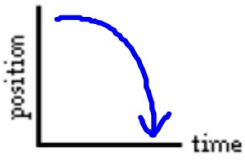
A Move in + dirn; speed up
B Move in + dirn; slow dn



A Move in - dirn; speed up
B Move in - dirn; slow dn



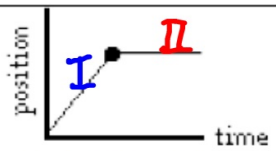
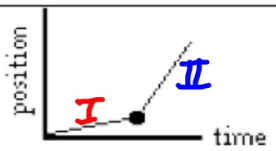
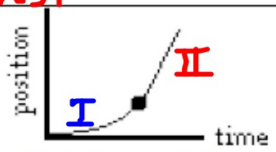
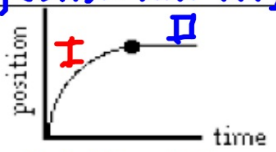
3. For each type of accelerated motion, construct the appropriate shape of a position-time graph.

Moving with a + velocity and a + acceleration	Moving with a + velocity and a - acceleration
	
Moving with a - velocity and a + acceleration	**Moving with a - velocity and a - acceleration**
	

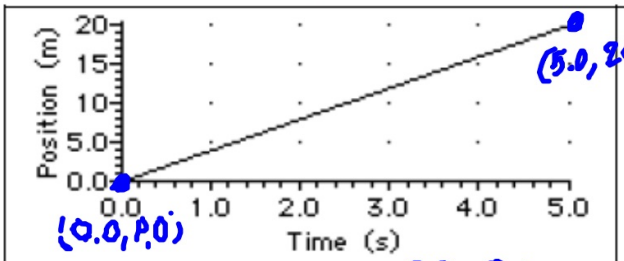
- vel ⇒ - direction
- slowing down
+ accel

- vel ⇒ - direction
+ speeding ↑
- accel

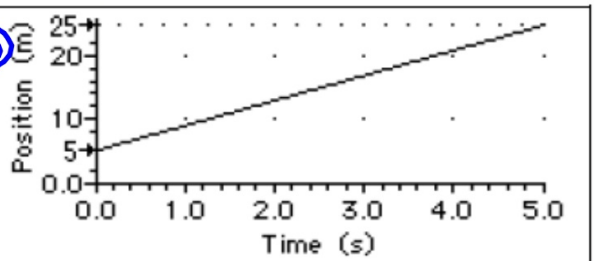
4. Use your understanding of the meaning of slope and shape of position-time graphs to describe the motion depicted by each of the following graphs.

 Verbal Description: I: +dir, const. vel., no accel. II: at rest	 Verbal Description: I: +dir; const. slow vel; no accel I: " "; const. fast vel; " "
 Verbal Description: I: +dir; speeding up; + accel II: +dir.; const. vel; no accel.	 Verbal Description: I: +dir; slowing down; - accel II: at rest

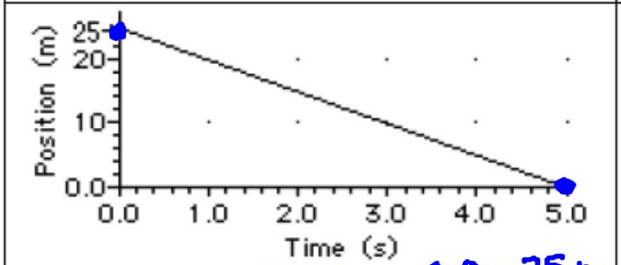
5. Use the position-time graphs below to determine the velocity. **PSYW**



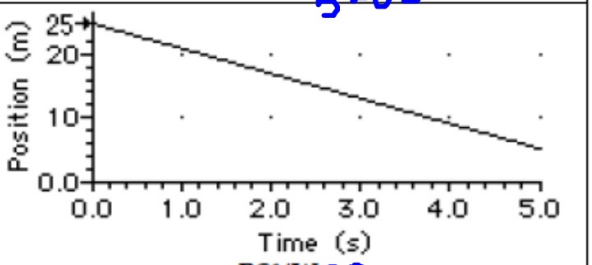
PSYW: $4.0\ m/s = \frac{20-0\ m}{5-0\ s}$



PSYW: $4.0\frac{m}{s} = \frac{25-5m}{5-0s}$



PSYW: $-5.0\ m/s = \frac{0.0-25\ m}{5.0-0.0\ s}$

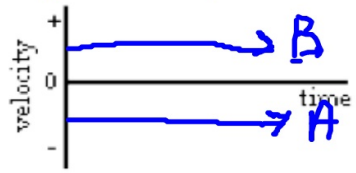


PSYW: $-4.0\frac{m}{s} = \frac{5-25\ m}{5-0\ s}$

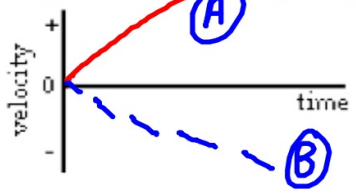
Interpreting Velocity-Graphs

2. On the graphs below, draw two lines / curves to represent the given verbal descriptions; label the lines / curves as A or B.

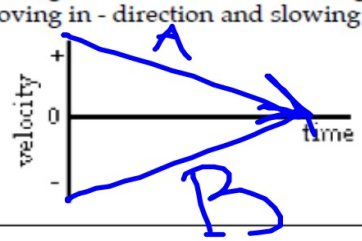
A Moving at constant speed in - direction
B Moving at constant speed in + direction



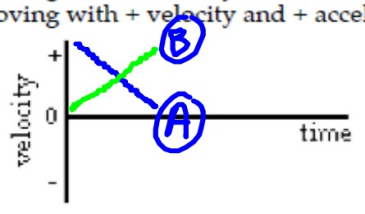
A Moving in + direction and speeding up
B Moving in - direction and speeding up



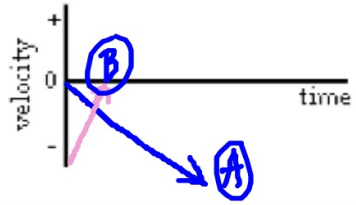
A Moving in + direction and slowing down
B Moving in - direction and slowing down



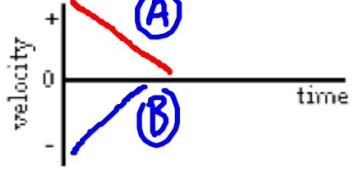
A Moving with + velocity and - accel'n
B Moving with + velocity and + accel'n



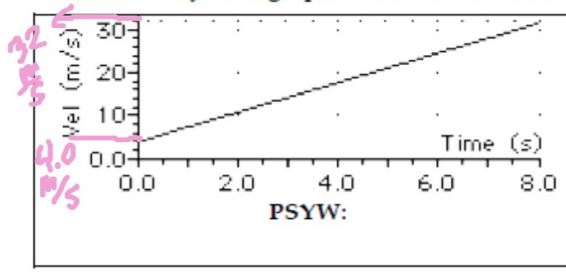
A Moving with - velocity and - accel'n
B Moving with - velocity and + accel'n



A Moving in + dir'n, first fast, then slow
B Moving in - dir'n, first fast, then slow



3. Use the velocity-time graphs below to determine the acceleration. **PSYW**



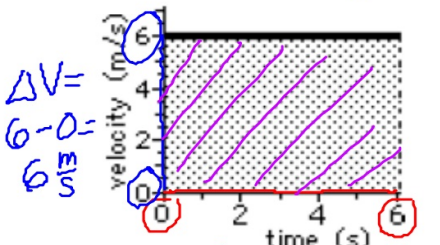
$$a = \frac{\Delta V}{\Delta t} = \frac{V_f - V_i}{t_f - t_i} = \frac{32 - 4.0\ \frac{m}{s}}{8.0 - 0.0\ s} = \frac{28\ \frac{m}{s}}{8.0\ s} = 3.5\ m/s^2$$

$$a = \frac{V_f - V_i}{t_f - t_i} = \frac{8.0 - 32\ \frac{m}{s}}{12 - 0.0\ s} = \frac{-24\ \frac{m}{s}}{12\ s} = -2.0\ \frac{m}{s^2}$$

4. The area under the line of a velocity-time graph can be calculated using simple rectangle and triangle equations. The graphs below are examples:

If the area under the line forms a ...

... **rectangle**, then use	... **triangle**, then use	... **trapezoid**, then make it into a rectangle + triangle and add the two areas.
area = base*height	area = 0.5 * base*height	



$\Delta V = 6 - 0 = 6\ \frac{m}{s}$

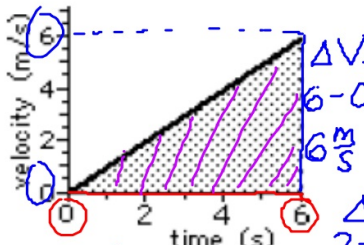
$\Delta t = 6 - 0 = 6\ s$

$A = (6\ m/s)(6\ s) = 36\ m$

$= (\Delta V)(\Delta t) = \Delta x$

$\frac{m}{s} * s = m$

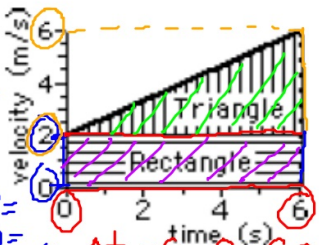
$V = \frac{\Delta x}{\Delta t}$



$\Delta V = 6 - 0 = 6\ \frac{m}{s}$

$\Delta t = 6 - 0 = 6\ s$

$A = 0.5 * (6\ m/s)(6\ s) = 18\ m$



$\Delta V = 2 - 0 = 2\ m/s$

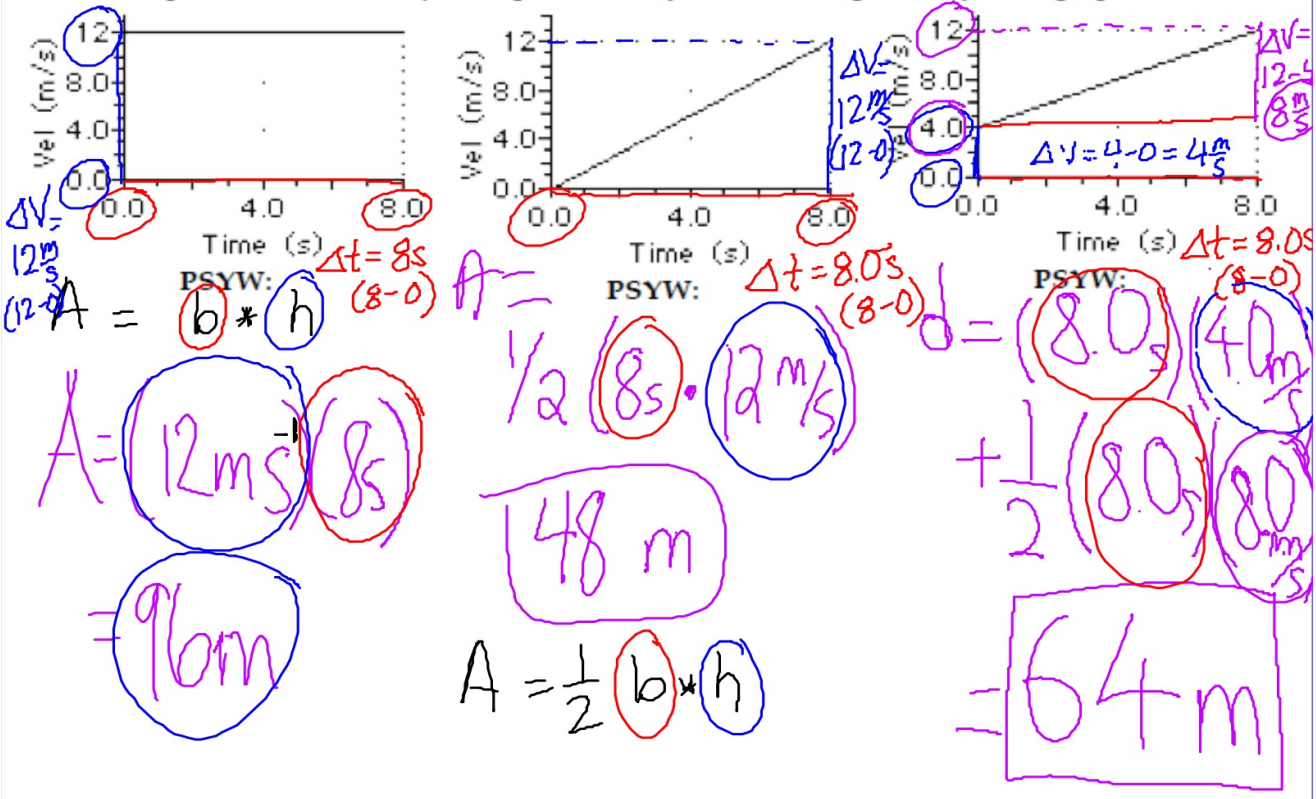
$\Delta t = 6 - 0 = 6\ s$

$A_{total} = A_{rectangle} + A_{triangle}$

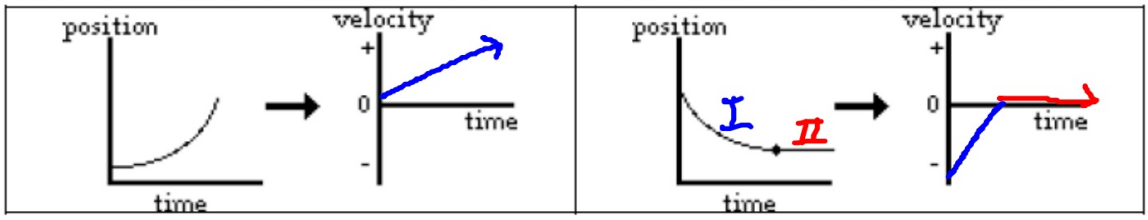
$A_{total} = (2\ m/s)(6\ s) + 0.5 * (4\ m/s) * (6\ s) = 24\ m$

$\Delta V = 6 - 2 = 4\ \frac{m}{s}$

Find the displacement of the objects represented by the following velocity-time graphs.



5. For the following pos-time graphs, determine the corresponding shape of the vel-time graph.



+ dir
speeding up
+ accel

I: - dir
slowing down
+ accel

II: at rest
accel = 0
vel = 0