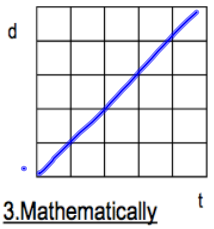
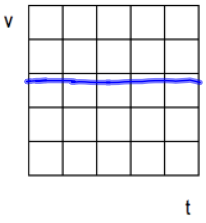
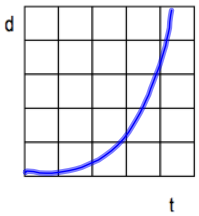
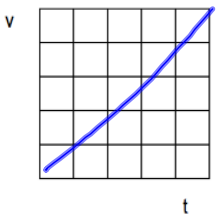
1a. Pattern: Linear	1b. Pattern: Horizontal	1c. Pattern: Quadratic	1d. Pattern: Linear
2. Graphically $d = V \cdot t$	$V = V$	$d = \frac{1}{2}at^2$	$V = at$
			
3.Mathematically			
$d = 5t$	$v = 5$	$d = 5t^2$	$v = 10t$

4. Data Tables:

t	d
1	5
2	10
5	25

t	v
1	5
2	5
5	5

t	d
1	5
2	20
5	125

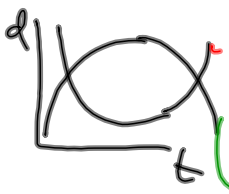
t	v
1	10
2	20
5	50

5. In words:

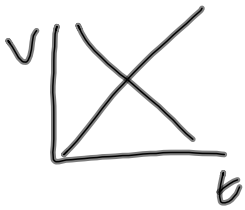
when time doubles, distance doubles	velocity is constant	when time doubles, distance is quadrupled	when time is doubles, velocity is also doubled

10. Distance VS time: Slope = velocity

Velocity vs. time graph: slope= acceleration

11. 

if there is a constant acceleration that means that the velocity has to be changing. Velocity is the slope of a distance time graph, so if the velocity is changing, the slope of a d vs t graph must also be changing.

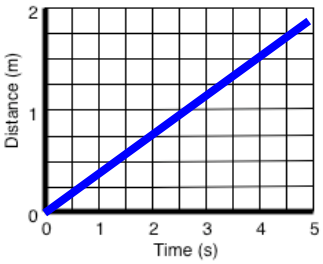
12. 

acceleration is the slope of a velocity time graph. we have a constant acceleration then there should be a constant slope to a V vs T graph.

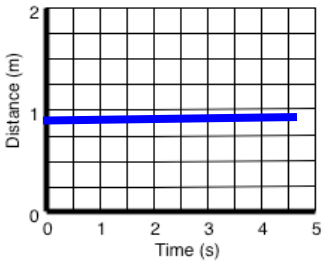
Identify the following d vs t and v vs t graphs as representing motion of

R-Rest CV-F Constant velocity (forward) CV-B Constant velocity (backward)

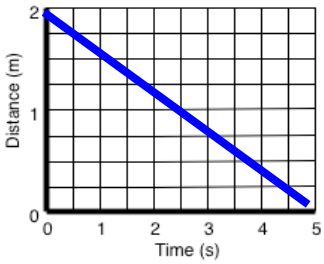
A-SU Accelerating (speeding up) A-SD Accelerating (slowing down)



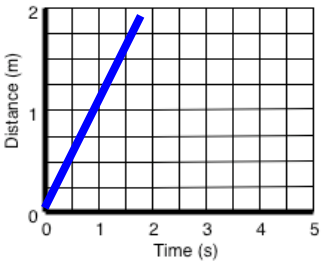
1. Answer : __CV-f_____



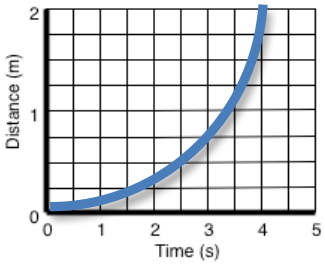
2. Answer : ___R_____



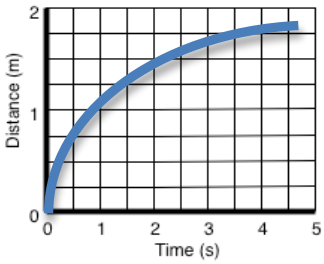
3. Answer : ____CV-B____



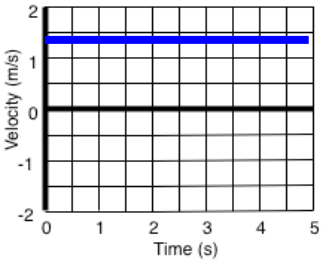
4. Answer : __CV-F_____



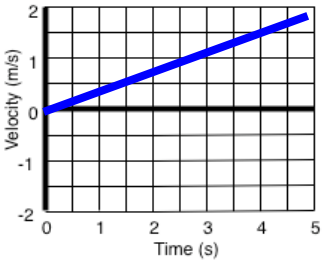
5. Answer : __A-SU_____



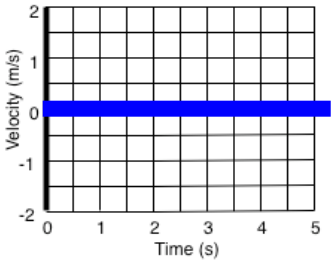
6. Answer : __A-SD_____



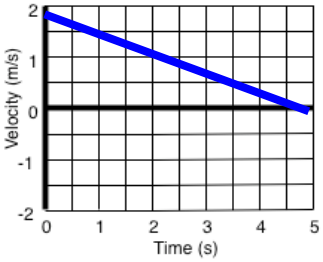
7. Answer : _CV-F_____



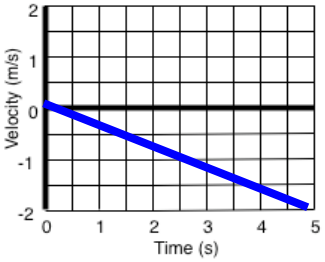
8. Answer : __A-SU_____



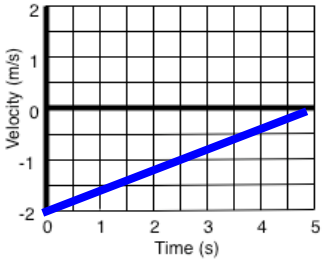
9. Answer : ___R_____



10. Answer : __A-SD_____



11. Answer : __A-SU____



12. Answer : __A-SD_____

13. At a high school level describe the difference in motion between graphs 1 and 4.

4 has a steeper slope (ie a bigger slope) so it has a higher velocity

14. At a high school level describe the difference in motion between graphs 1 and 8.

1 is a distance time graph with a constant positive slope and therefore a constant positive velocity

8 is a velocity time graph with a constant positive slope so the velocity is changing and there is a constant positive acceleration

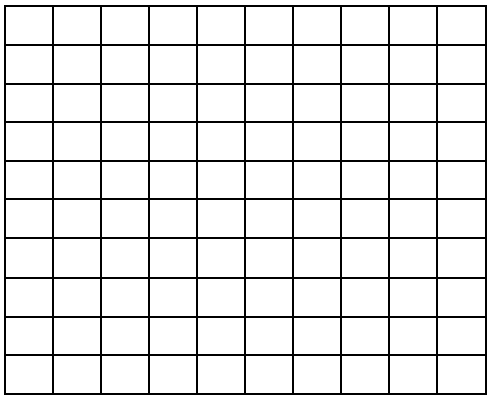
Generating and Analyzing Graphs of Motion

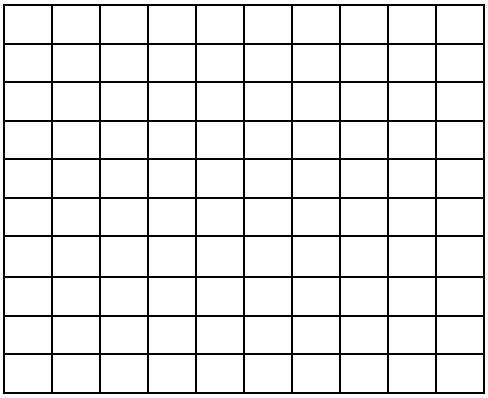
Using the information provided in each problem fill out the data table, graph the time versus distance and the time versus velocity on the graphs provided, and then sketch in your simplest best fit line. Finally answer the questions for each problem:

1. A car moves at a constant velocity of 15.0 m/s.

time (s) +/- 0.2	Distance (m) +/- 1.0	Velocity (m/s) +/- 0.5	Acceleration (m/s^2)
0.0	0.0	15.0	0.0
1.0	**15**	**15**	0.0
2.0	**30**	**15**	0.0
3.0	**45**	**15**	0.0
4.0	**60**	**15**	0.0

Use the data above to sketch a distance vs time graph and a velocity vs time graph below:





a) Find the slope of the d vs t graph. What does the slope tell you about the motion of the car?
Slope of distance time graph is the velocity

b) Find the slope of the v vs t graph. What does the slope tell you about the motion of the car?
Slope of the velocity time graph is the acceleration

c) Write the equation that represents each graph.

d = **15 t** v = **15**

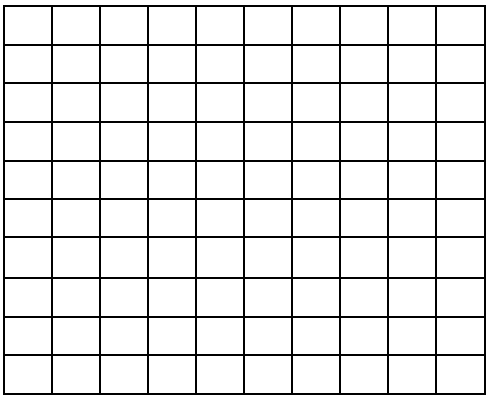
d) What distance and velocity would you predict for this car at a time of 30 seconds?
Velocity is constant so it would still be 15 m/s
Use the equation d = 15 t: the distance at 30 seconds would be 450m

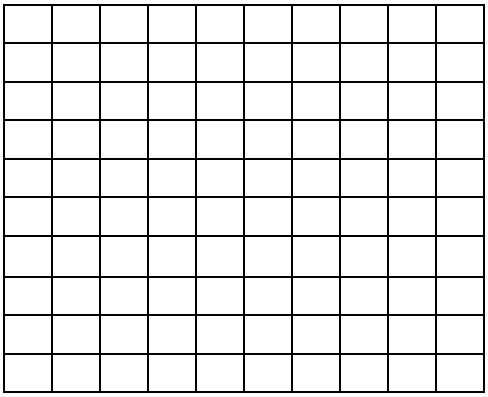
e) How long will it take the car to travel 6000 m?
use the same equation but solve for time: t = d / 15. Time will be 400 seconds

2. A golf ball is dropped off the top of the bleachers in free fall. Free fall means the ball accelerates at 10.0 m/s^2 (we will neglect air resistance for this problem).

time (s) +/- 0.2	Distance (m) +/- 1.0	Velocity (m/s) +/- 0.5	Acceleration (m/s^2)
0.0	0.0	0.0	10.0
1.0	5.0	10.0	10.0
2.0	**20**	**20**	10.0
3.0	**45**	**30**	10.0
4.0	**80**	**40**	10.0
5.0	125.0	**50**	10.0

Use the data above to sketch a distance time graph and a velocity time graph below





a) Find the slope of the v vs t graph. What does the slope tell you about the motion of the rock?
Slope of V vs t graph 10m/s/s. It is the acceleration.

b) What does the y-intercept on the v vs t graph signify?
The initial velocity

c) Write the equation that represents each graph

d = **5 t^2** v = **10 t**

d) What distance and velocity would you predict for the rock after it has fallen for 10.0 seconds?

d = 5 (10)^2 = 500 m **v = 10 (10) = 100 m/s**