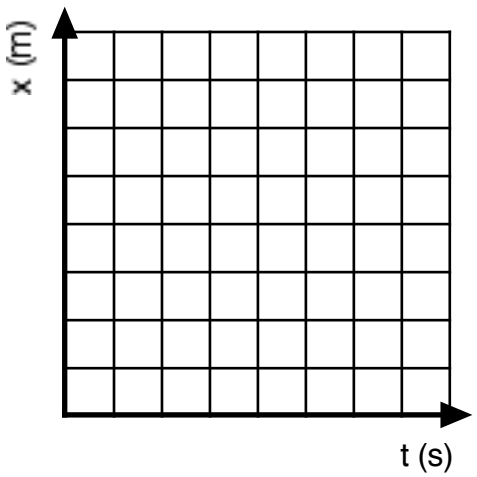
Name_____

Constant Velocity Particle Model Worksheet 2:

Position vs. Time and Velocity vs. Time Graphs

1. Robin, rollerskating down a marked sidewalk, was observed at the following positions at the times listed below:

t (s)	x (m)
0.0	0.0
2.0	2.0
4.0	4.0
6.0	4.0
8.0	3.0
10.0	2.0
12.0	2.0
14.0	5.0
16.0	8.0



a. Plot the position vs. time graph for the skater.

b. What do you think is happening during the time interval: t = 4s to t = 6s? How do you know?

c. What do you think is happening during the time interval: t = 6s to t = 10s? How do you know?

d. Determine the skater's average **velocity** from t = 0s to t = 16s. (Average **velocity** is the displacement (final position minus initial position) divided by time elapsed.)

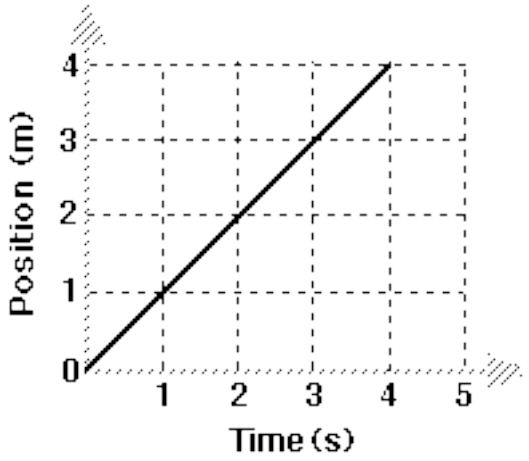
e. Determine the skater's average **speed** from t = 0s to t = 16s. (Average **speed** is the distance traveled along the path (change in odometer reading) divided by time elapsed.)

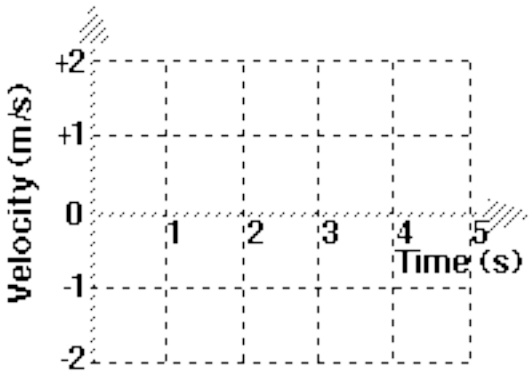
f. In what situation is average **speed** a better measure of motion than average velocity?

g. In what situation is average **velocity** a better measure of motion than average speed?

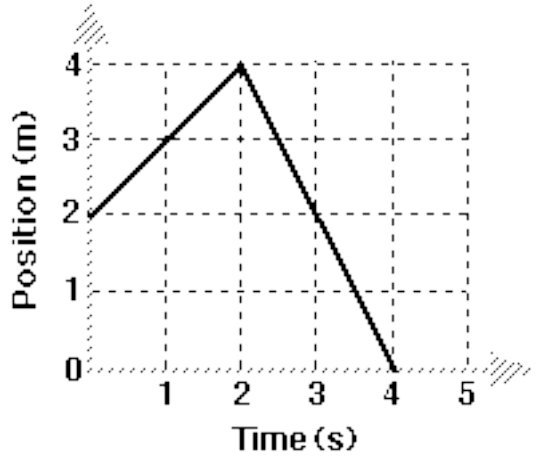
Draw the velocity vs time graphs for an object whose motion produced the position vs time graphs shown below at left.

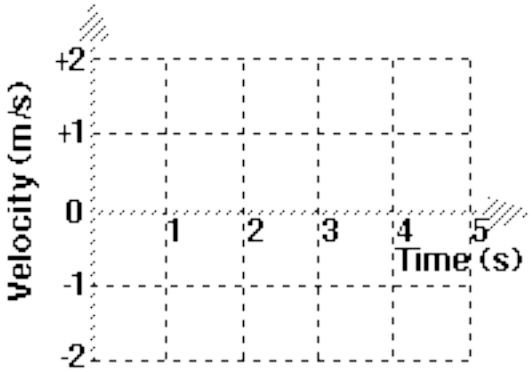
2.



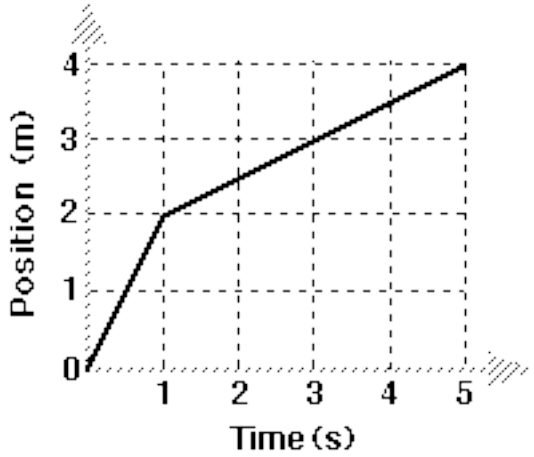


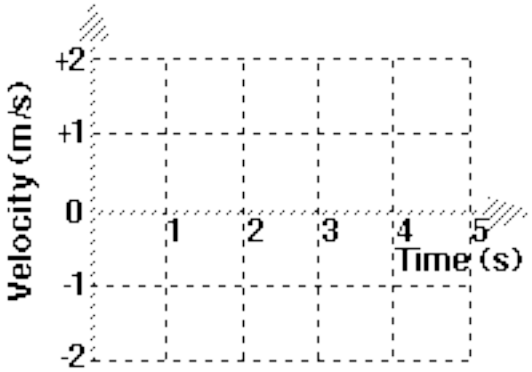
3.





4.





5. For many graphs, both the **slope** of the line and the **area** between the line and the horizontal axis have physical meanings.

a. What does the slope of a position time graph tell you about the motion of an object?

b. Looking at the velocity time graphs, determine the units for a square of area on the graph.

c. What does the area under the velocity-time graph tell you about the motion of an object?