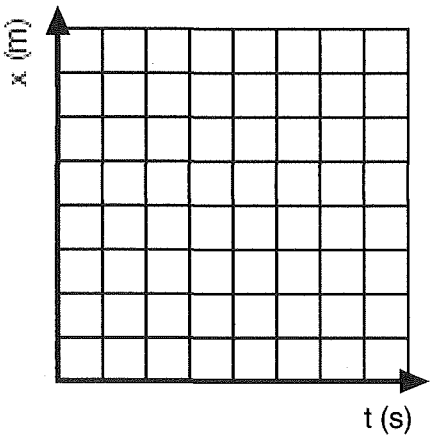
Constant Velocity Particle Model Worksheet 2:

Position vs. Time and Velocity vs. Time Graphs

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

t (s)	x (m)
0.0	10.0
1.0	12.0
2.0	14.0
5.0	20.0
8.0	26.0
10.0	30.0



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

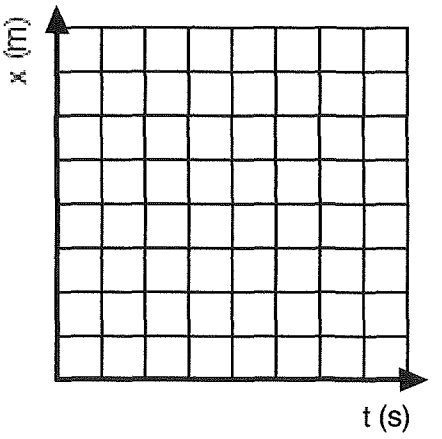
b. Explain how you can use the graph to determine how far he was from the origin at t = 6s.

c. Write a mathematical model that describes the skater's motion.

d. Was his speed constant over the entire interval? How do you know?

3. Suppose now that our skater was observed in a third trial. The following data were obtained:

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?