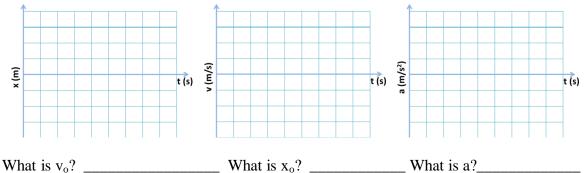
## Worksheet 1.8

Motion Equations; X-direction only

1. Write down the four main equations that describe motion in the x-direction.

2. A hockey puck leaves a player's stick from a position of x = 2 m with a velocity of 25 m/s and moves across the ice with a constant deceleration of 0.5 m/s<sup>2</sup> due to friction from the ice. Draw x vs t, v vs t, and a vs t graphs that describe this situation. Make sure to label your axis.



3. Rewrite the equations from (1) for this system by substituting in the variables provided.

4. What is the velocity of the puck at 1 second?

5. What is the position of the puck at 1 second?

6. How long does it take for the puck to reach the goal that is 5 meters away?

7. How fast is the puck traveling when it reaches the goal?

## Draw a motion diagram and x vs t, v vs t, and a vs t graphs for each of the following word problems in addition to answering the questions.

<i>-</i>	
8.	A gust of wind hits a beach ball already moving with a velocity of 2 m/s to the west. The wind hits the ball for 4 seconds and then stops. When the wind stops, the ball is moving 3 m/s to the east. What was the acceleration of the ball due to the wind?
9.	If a ball initially started at $x = 0$ m with an eastward velocity of 3 m/s and an acceleration of 1 m/s <sup>2</sup> to the east, how far will it have traveled after 6 seconds?
10.	What is the acceleration of a tennis ball if initially it comes toward the player's racquet at $20 \text{ m/s}$ , and it leaves in the opposite direction at $24 \text{ m/s}$ ? A high-speed camera indicates the time of impact of $4.0 \text{ ms}$ .

11. A motorcyclist is traveling 10 m/s is 200 m behind a car at traveling at a steady 20 m/s. How fast must the motorcyclist accelerate in order to pass the car in 5 seconds?
12. A car moving with a velocity of 20 m/s requires 3 m to stop. What is the acceleration of the car while stopping? How far would a car traveling at 40 m/s need to stop assuming the same rate of acceleration as the first car?