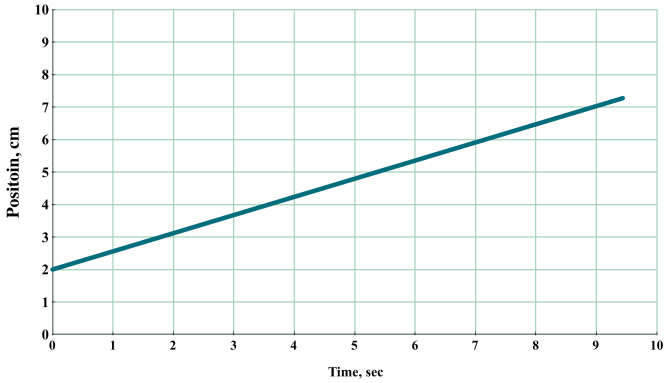
NAME PERIOD DATE

✎ Practice#1: Motion Graphs & Calculations ✐

1. The position of a wind-up toy is shown over several seconds.



a. _____ Estimate the initial position the toy.

b. _____ Calculate the average velocity of the toy for the motion shown.

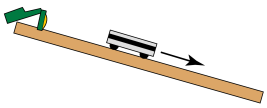
c. _____ Write a position equation for the toy's motion

d. _____ If the toy were to continue moving in this way, where would it be at 20.0 seconds?

2. A cart rolls down the ramp. Its **initial position** is 0.55 m and its **initial velocity** is 0.20 m/s. It **accelerates** at a rate of 2.4 m/s^2.

a. _____ Write the position equation for the cart's motion using these values.

b. _____ Calculate its **position** at 0.40 second.

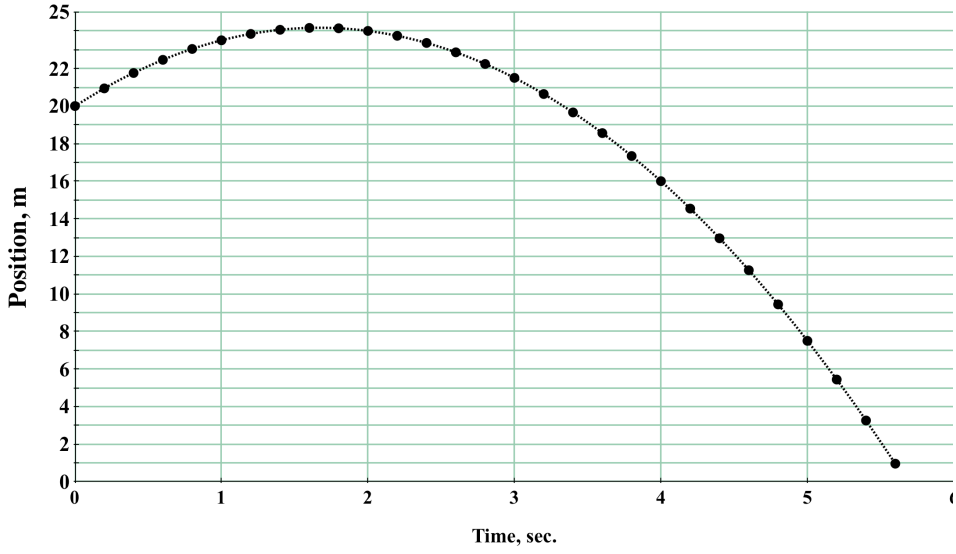


c. _____ Calculate its **velocity** at 3.0 seconds.

d. Sketch a position-time, velocity-time and an acceleration-time plot for the cart's motion. Mark any known values on the graphs (such as x_0, v_0 and a)

3. The position-time graph of a car is shown over several seconds.

a. Describe the type of motion that created this graph.



b. _____ What was the car's **initial position**?

c. _____ Did the car have an **initial velocity**? How can you tell?

d. _____ What is the **displacement** of the car over the first five seconds?

e. _____ Calculate the car's **average velocity** over the first five seconds.

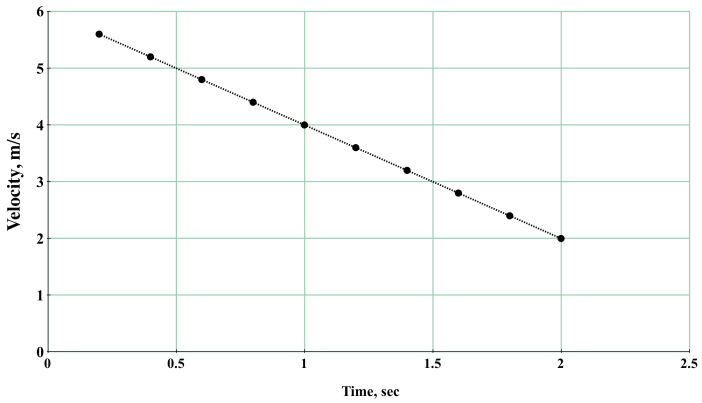
f. _____ Calculate the approximate **instantaneous velocity** of the car at 3.0 seconds.

g. Why doesn't the *average* velocity for the entire trip equal the *instantaneous* velocity of the car at 2.6 seconds?

h. _____ Estimate when the instantaneous velocity is approximately zero.

4. The graph shows the velocity vs. time for a rolling ball.

a. Describe how the ball is moving.



b. _____ What is the ball's **acceleration**?

c. _____ What is the ball's **initial velocity**?

d. _____ Write a general equation for the ball's velocity using the starting velocity and acceleration.

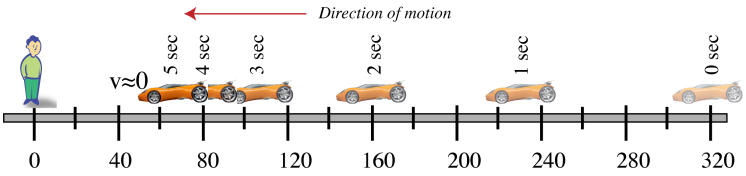
e. _____ How fast would the ball be moving at the 2.0 seconds?

f. _____ Calculate the time when the ball will stop.

g. _____ Calculate the ball's total **displacement** for the data shown.

5. The changing positions of a car shown in the picture.

a. _____ *Identify* the values that are given.



b. Describe the motion shown.

c. _____ Estimate the car's displacement.

d. _____ Calculate the average velocity of the car from 0 to 5 seconds.

e. _____ Calculate the acceleration of the car.

6. A pumpkin is thrown directly upward with an **initial velocity** of 19.6 m/s.

a. _____ Identify the known values for this situation. (x, x_o, v, v_0, a, t)

b. _____ How much **time** will it take for the pumpkin to reach its maximum height?

c. _____ How **high** will the pumpkin get?