Draw a position vs. time and velocity vs. time graph for each of the following cases.

1. An object moving with constant velocity in the positive direction.



1. An object moving with constant negative velocity.



1. An object slowing down at a constant rate.



1. An object changing directions.



1. An object speeding up at a constant rate.

1. An object moving with positive acceleration.



1. An object moving with negative acceleration.



A spark timer is used to record the position of a lab cart accelerating uniformly from rest. Each 0.10 second, the timer marks a dot on a recording tape to indicate the position of the cart at that instant, as shown.

1. Using a metric ruler, measure the distance the cart traveled during the interval *t* = 0 second to *t* = 0.30 second. Record your measurement to the *nearest tenth of a centimeter*.
2. Calculate the magnitude of the acceleration of the cart during the time interval *t* = 0 second to *t* = 0.30 second.
3. Calculate the average speed of the cart during the time interval *t* = 0 second to *t* = 0.30 second.
4. On the diagram *below*, mark *at least four* dots to indicate the position of a cart traveling at a constant velocity.

Use the data in the chart below to answer the questions that follow.

|  |  |
| --- | --- |
| Time (s) | Displacement (cm) |
| 0.0 | 0 |
| 1.0 | 18 |
| 2.0 | 42 |
| 3.0 | 63 |
| 4.0 | 78 |
| 5.0 | 96 |

1. Plot the points for displacement versus time on the graph below. Use an appropriate scale.
2. Draw a best-fit line.
3. Determine the slope of the line.
4. What is the significance of the slope of this line?



1. Calculate the instantaneous velocity at t = 0.8s on the accompanying graph below.

