

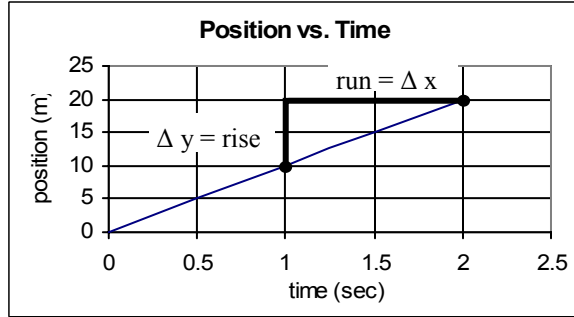
Name: \_\_\_\_\_

Period: \_\_\_\_\_

# Graphing Speed; Slope

The graph on the right is a **distance versus time graph**. That means that it shows how far an object has traveled after so many seconds.

This is what we call a **linear graph**, because the data creates a **straight line**.



Data

Time (sec)	Distance (m)
0	0
0.5	5
1	10
1.5	15
2	20

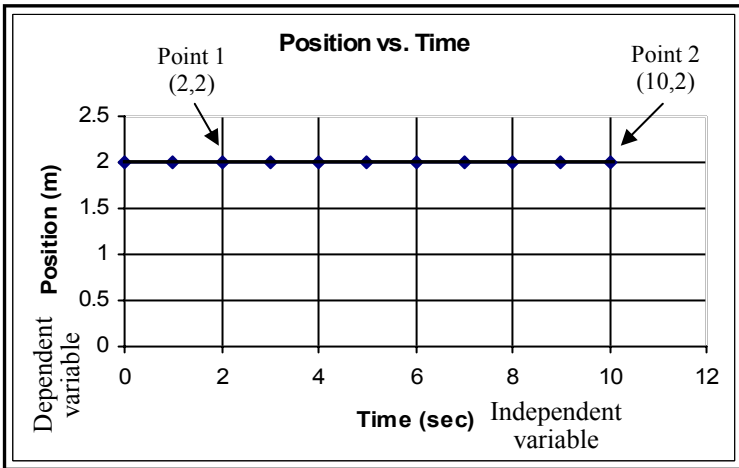
**Slope has actual meaning in science –**

Slope for the above graph:

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(20 - 0)\text{m}}{(2 - 0)\text{sec}} = \frac{20\text{m}}{2\text{sec}} = 10\text{m/s}$$

*The slope of a position vs. time graph is **SPEED***

**Graphing Conventions:** The independent variable is always on the x-axis.  
The dependent variable is always on the y-axis.



Independent variable—Time  
Dependent variable—position

**Time is always an independent variable (x-axis).**

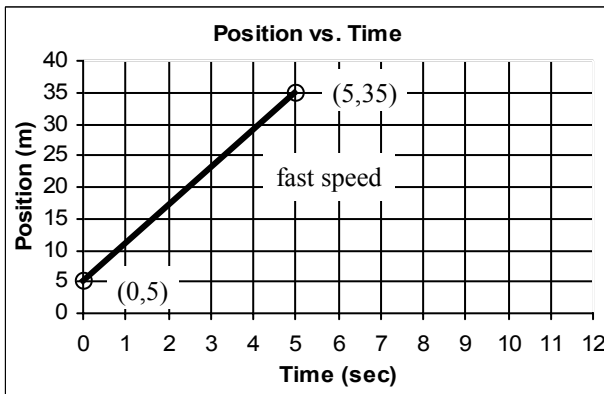
Linear graph.

Position vs. time graph, so slope = speed (position/time)

(Pick any two points)  
Slope = rise/run =  $\Delta y / \Delta x$  =

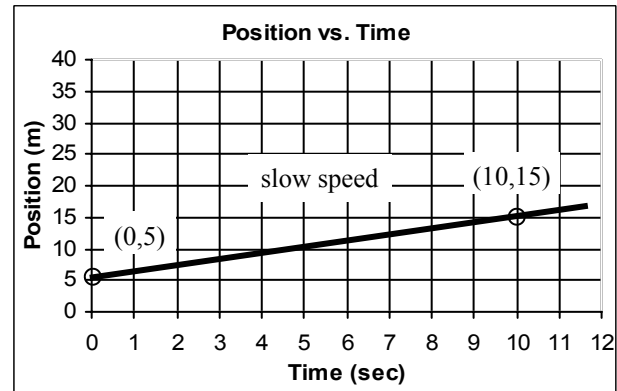
$$\frac{(2 - 2)\text{m}}{(10 - 2)\text{sec}} = \frac{0\text{m}}{8\text{sec}} = 0\text{m/s}$$

**The slope (speed) of a flat line is zero—no speed. The object is at rest.**



**Steep slope—fast speed**

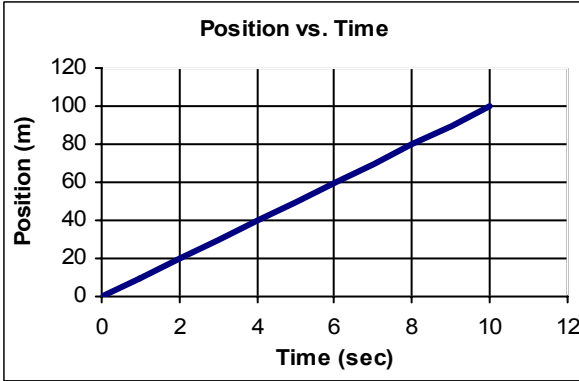
**Gradual slope—slow speed**



$$\text{slope} = \frac{\Delta y}{\Delta x} = \frac{(35 - 5)\text{m}}{(5 - 0)\text{sec}} = \frac{30\text{m}}{5\text{sec}} = \text{6m/s}$$

$$\text{slope} = \frac{\Delta y}{\Delta x} = \frac{(15 - 5)\text{m}}{(10 - 0)\text{sec}} = \frac{10\text{m}}{10\text{sec}} = \text{1m/s}$$

1. Linear	A. The variable on the vertical axis (y-axis).	Which of the following are units for speed?			
2. Independent variable	B. A type of graph that looks like a straight line.	km	<u>meters</u>	meters	<u>cm</u>
3. Dependent variable	C. The measure of the steepness of a line.		sec		sec
4. Slope	D. The variable on the horizontal axis (x-axis).	sec	<u>miles</u>	<u>km</u>	<u>meter</u>
			hour	min	sec <sup>2</sup>



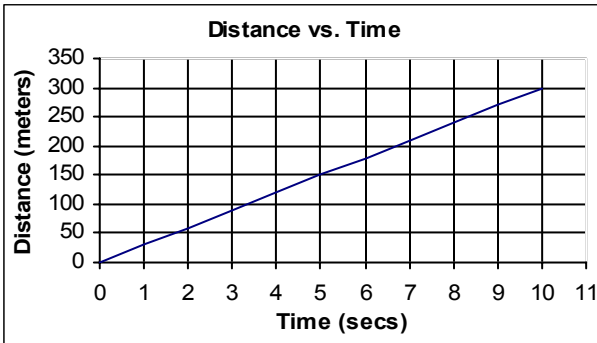
Which is the independent variable? \_\_\_\_\_

Which is the dependent variable? \_\_\_\_\_

Where was the object at 4 seconds? \_\_\_\_\_

Find the slope of the graph (must show work)

What does the slope you just found stand for? \_\_\_\_\_

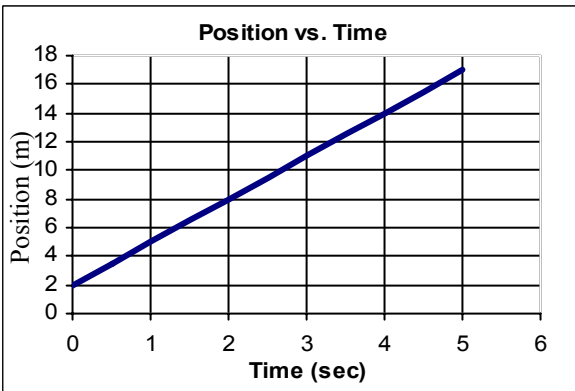


When did the object reach 150 meters? \_\_\_\_\_

Where was the object at 9 seconds? \_\_\_\_\_

Find the slope of the graph (must show work)

What does the slope you just found stand for? \_\_\_\_\_



Which is the independent variable? \_\_\_\_\_

Which is the dependent variable? \_\_\_\_\_

Where was the object at 4 seconds? \_\_\_\_\_

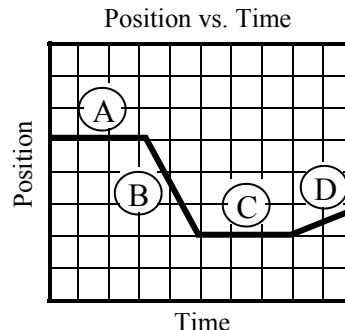
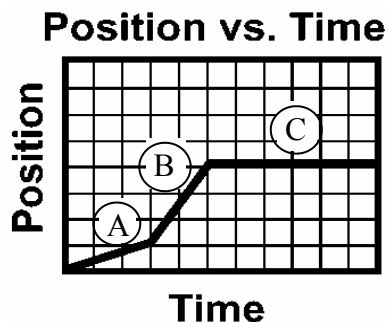
Find the slope of the graph (must show work)

What does the slope you just found stand for? \_\_\_\_\_

The slope of this graph means:

The segment that shows fast speed:

The segment that shows slow speed:



Which graph segments fit the following:

At rest:

Fast speed:

Slow speed:

Going backwards:

Going forward: