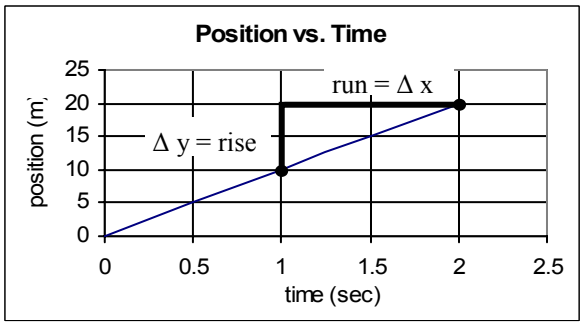
Name: _____

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 –

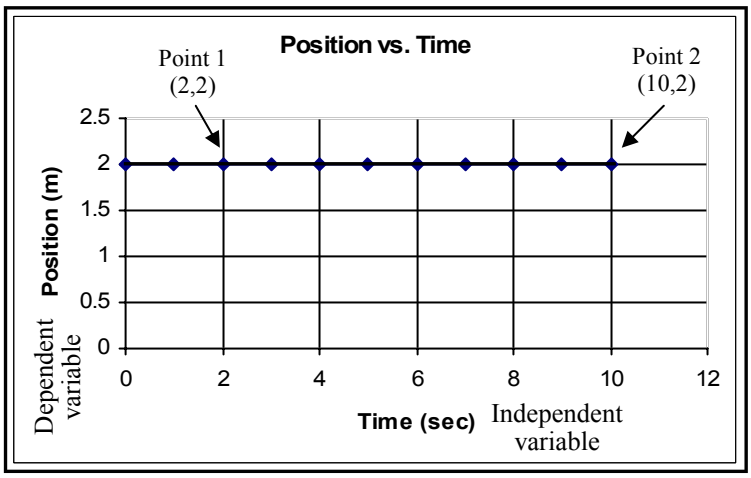
Slope for the above graph:

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(20 - 10)\text{m}}{(2 - 1)\text{ sec}} = \frac{10\text{m}}{1\text{ sec}} = 10\text{m/s}$$

The slope of a position vs. time graph is <u>SPEED</u>

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

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



Independent variable—Time
Dependent variable—position

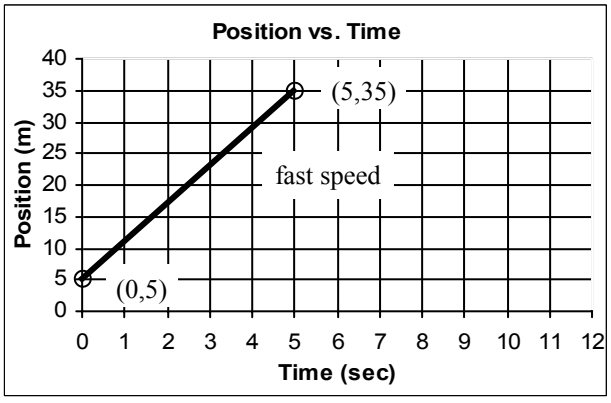
Linear graph.

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

(Pick any two points)
Slope = rise/run = Δy/Δx =

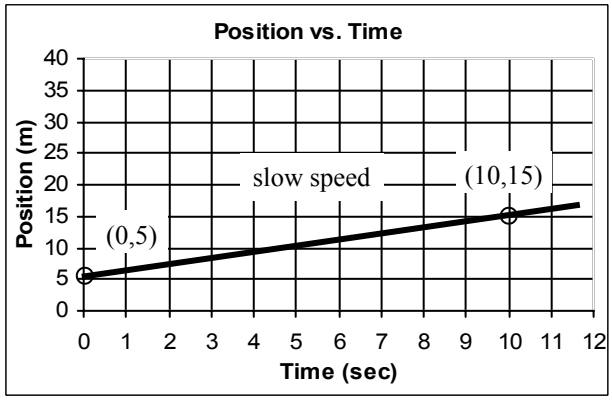
$$\frac{(2 - 2)\text{m}}{(10 - 2)\text{ sec}} = \frac{0\text{ m}}{8\text{ sec}} = 0\text{ m/s}$$

The slope (speed) of a flat line is zero—<u>no speed</u>. The object is at rest.



Steep slope— fast speed

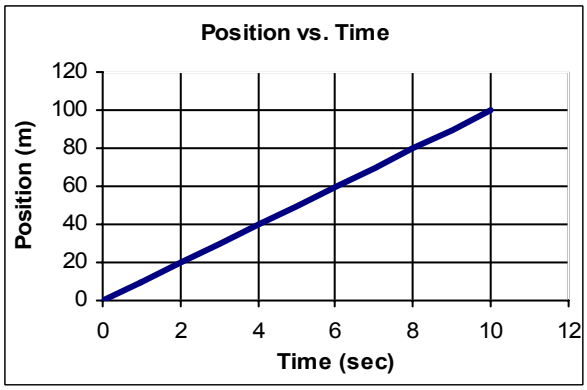
Gradual slope — slow speed



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

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

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



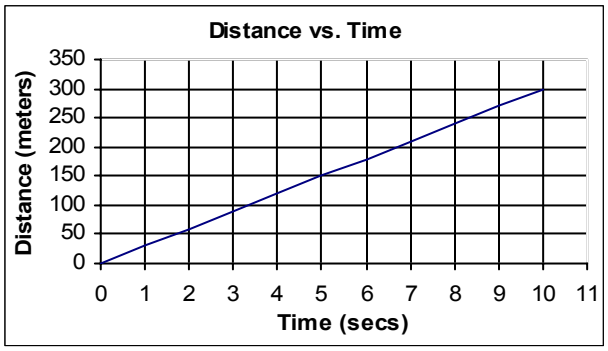
Which is the independent variable? _____

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? _____

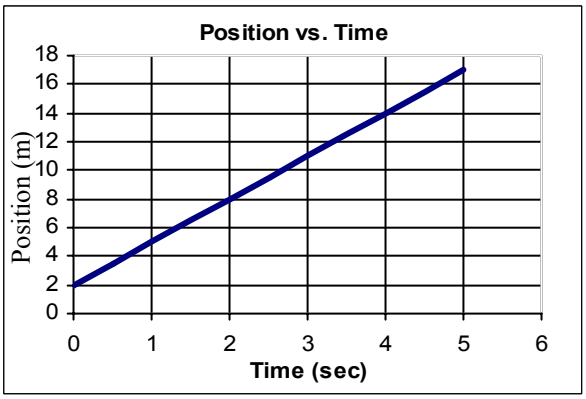


When did the object reach 150 meters? _____

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? _____

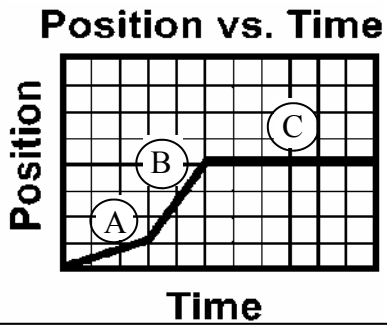
Find the slope of the graph (must show work)

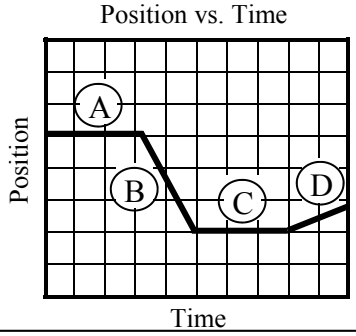
What does the slope you just found stand for? _____

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: