

Physics: Graph, Slope, and Equation Concepts Review

Name _____

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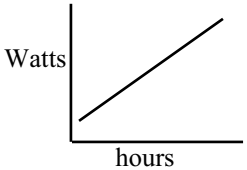
Date _____ Period ____

- A graph of “A versus B” always has A on the vertical axis and B on the horizontal axis.
- The slope of a section of a graph is the change in y over change in x. If the graph is a curve, the slope of the graph at a certain point can be found by drawing a tangent to the graph, and finding the slope of the tangent. The unit of the slope will equal the y-unit divided by the x-unit.
- The “area under a graph” is the area between the graph and the x-axis. This is a very useful quantity in many situations. The unit of the slope will equal the y-unit multiplied by the x-unit.

For each of the following, sketch a small graph and state:

- a) what the units of the slope are
- b) what the units of the area are

1. Persons versus hours, increasing quadratically

Example	Graph Watts per hour, increasing
.	
	<p>Graph might be power usage in a home during one day.</p> <p>Slope would be Watts per hour</p> <p>Area would be Watt•hours</p>

2. Meters per second vs. seconds, constant

4. Force (N) vs. distance (m), directly proportional

3. Grams per mL vs. degrees Celsius; inversely proportional

5. Meters vs. kilograms, decreasing linearly

Solving an equation for a variable

Very often, you are given an equation in physics, but it is not solved for what you need. For example, $\mathbf{F} = \mathbf{ma}$ is Newton's 2nd Law, solved for \mathbf{F} , force. But you may be looking for \mathbf{a} , acceleration.

You need to divide both sides of the equation by \mathbf{m} , mass, to get $\mathbf{a} = \frac{\mathbf{F}}{\mathbf{m}}$

This is important, because a lot of times, variables will cancel out of an equation, so you don't need to know that variable. Also, you may be asked for the "general solution" for a variable, which means you need the equation, solved for that variable.

Solve the following equations for the variable indicated:

On the right side, indicate in sentences what algebraic steps you did. (Example: Divide both sides by 3)

1) $3y = 2x + 7$, for x

2) $d = \left(\frac{v_o + v_f}{2} \right) t$, for t

3) $2ad = v_f^2 - v_o^2$, for v_f

$$4) \quad T = 2\pi\sqrt{\frac{m}{k}}, \text{ for } k$$

$$5) \quad \frac{1}{R} = \frac{1}{x} + \frac{1}{y}, \text{ for } R$$

You may need to substitute an equation into another equation, in place of a variable.

6) Solve for x and y:

$$x = y + 9$$

$$2x - 5y = 24$$

7) Solve for P, in terms of V and R: (get rid of the I)

$$P = IV$$

$$V = IR$$

8) Analyze this graph to the best of your ability. You may give both qualitative and quantitative observations.

