**Physics: Graph, Slope, and Equation Concepts Review** Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3/19/14 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.

Example:

Graph Watts per hour, increasing

Watts

hours

Graph might be power usage in a home during one day.

Slope would be Watts per hour

Area would be Watt•hours

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

2. Meters per second vs. seconds, constant

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

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

$F=ma$ is Newton’s 2nd Law, solved for **F**, force. But you may be looking for **a**, acceleration.

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

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 *vf*

4) $T=2π\sqrt{\frac{m}{k}}$ , for k

5) $\frac{1}{R}= \frac{1}{x}+\frac{1}{y} $, 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.