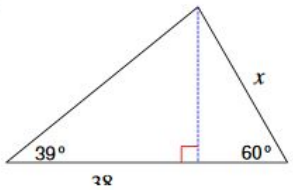
Welcome to AP Physics I, a rigorous but exciting Algebra based college Physics class! This summer assignment is designed to act as a review of some math concepts that you will need throughout this course. If you encounter any difficulties I encourage you to search the topic name on Khan Academy - they have a lot of great math videos, but also a nice AP Physics I subject area. Please try your hardest with these topics, I want to see what you know! **Show your work on separate paper**, *numbered and labeled carefully.*

I look forward to teaching you this Fall!
-Mrs. Katz

Part 1 - Trigonometry

Find the length of the side labeled x. Round intermediate values to the nearest tenth. Use the rounded values to calculate the next value. Round your final answer to the nearest tenth.

1)



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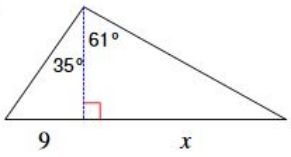

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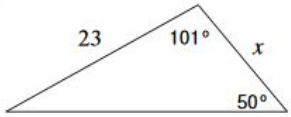

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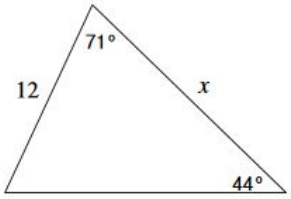
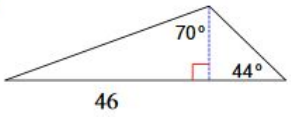


Find the area of each triangle. Round intermediate values to the nearest tenth. Use the rounded values to calculate the next value. Round your final answer to the nearest tenth.

5)



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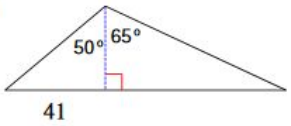

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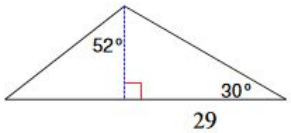
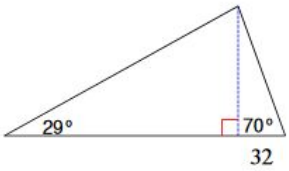


8)



Part II - Graphing

You have been asked by your teacher to measure the diameter,and circumference of some round objects, such as tin cans, lids, CD's, coins, etc. You have collected the measurements and recorded them in the table below.

Diameter (cm)	Circumference (cm)
2.2	6.7
6.4	20.1
9.6	32
17.6	54.1
19.2	65
24	76.1

1) You are to graph the data. The diameter is the independent variable, and the circumference is the dependent. What does this mean for how you graph the data?

2) Graph the data labeling the axes and using appropriate scale(s) and units. Then plot the points. Draw a line of best fit through the data (do not just connect them!). *Please use graph paper, or use Desmos with a best fit line.*

3) Find the slope of your best fit line. Does it have a name or physical meaning?

4) Is the slope constant? How do you know this?

5) Does the graph have a y-intercept? If so, what is its significance?

Part III - Solving Literal Equations and Formulas

Often problems on the AP exam are done with variables only. Below are various physics formulas. Don't worry about what the variables mean for now; we will learn that later. Just solve for the variable indicated. Don't let the different letters confuse you. Manipulate them algebraically as though they were numbers.

Directions: Use algebra to solve for the indicated variable. Please show all work.

1) $\Delta V = IR$, solve for I

2) $mgh = \frac{1}{2} mv^2$, solve for v

3) $v_f = v_o + at$, solve for a

4) $\Delta x = v_o t$, solve for t

5) $v_f^2 = v_o^2 + 2a(x_f - x_0)$, solve for a

6) $T = 2\pi\sqrt{\frac{l}{g}}$ solve for g

Part IV - Algebraic relationships and proportionality

Consider the following: $z = x/y$ $c = ab$ $l = m\sqrt{n}$ $r = s^2/t^2$

1) As *x* increases and *y* stays constant, *z* _____.
2) As *y* increases and *x* stays constant, *z* _____.
3) As *x* increases and *z* stays constant, *y* _____.
4) As *a* increases and *c* stays constant, *b* _____.
5) As *c* increases and *b* stays constant, *a* _____.
6) As *b* increases and *a* stays constant, *c* _____.
7) As *n* increases and *m* stays constant, *l* _____.
8) As *l* increases and *n* stays constant, *m* _____.
9) If *s* is tripled and *t* stays constant, *r* is multiplied by _____.
10) If *t* is doubled and *s* stays constant, *r* is multiplied by _____.