AP Physics Summer Assignment

"If I had eight hours to cut down a tree, I'd spend six hours sharpening my ax."
-Abraham Lincoln

Directions: To be prepared for the pace and rigor of AP Physics, you should be able to answer the following questions. Solve these problems on separate sheets of paper. Show every step of your work clearly, and circle/box your final answer. Bring your completed summer assignment with you on the first day of class. If you have any questions you can reach Mr. Moos by email at amoos@leadps.org.

Algebra

1. Given the equation: $2a - bc = c$
   a. Solve the equation for *a* (get *a* by itself).
   b. Solve for *b*.
   c. Solve for *c*.
2. Given the equation: $11 - t^2 = ac + bc$
   a. Solve for *a*.
   b. Solve for *b*.
   c. Solve for *c*.
   d. Solve for *t*.
3. Express the following fractions as decimals: $\frac{1}{3}, \frac{1}{10}, \frac{1}{100}, \frac{3}{100}, \frac{7}{1000}$
4. Express the following decimals as fractions: 0.5, 0.25, 0.2, 0.1, 0.06, 0.009
5. Solve the quadratic equation for x: $3x^2 - 5x + 6 = 5$
6. Find a solution that will satisfy each system of equations.
   a. $y = 3x$ and $2x + 2y = 32$
   b. $f - g = 5$ and $3f + 2g = 5$
7. The following questions involve formulas you will use in AP Physics. Do not be confused by the variables and their subscripts. For example, treat v and v_o as you would two different numbers.
   a. $v = v_o + at$ $\quad a =$ _____
   b. $v^2 = v_o^{\,2} + 2a\Delta x$ $\quad a =$ _____
   c. $PV = nRT$ $\quad T =$ _____
   d. $KE = \frac{1}{2}mv^2$ $\quad v =$ _____
   e. $T = 2\pi\sqrt{\frac{l}{g}}$ $\quad l =$ _____
   f. $F_g = G\frac{m_1 m_2}{r^2}$ $\quad r =$ _____
   g. $B = \frac{\mu_o I}{2\pi r}$ $\quad I =$ _____
   h. $\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$ $\quad d_i =$ _____

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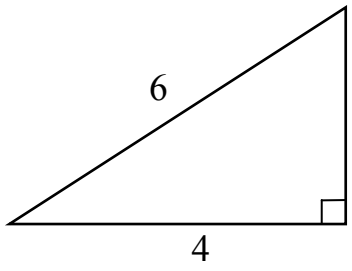
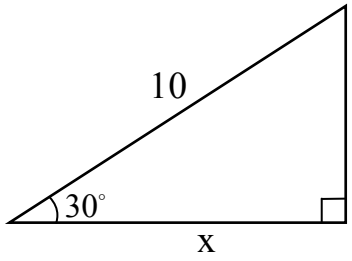
Geometry and Trig

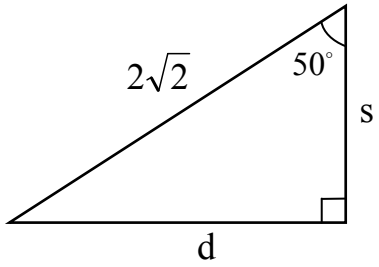
8. Find the missing side.



9. Find the missing side x.



10. Find both missing sides and the missing angle.



Scientific Notation

11. What does 2.45×10^{9} mean? Expand it.
12. Fill in the blanks to make the equation equal.
    a. $\_\_\_\_\_\times10^{4}=31{,}000$
    b. $\_\_\_\_\_\times10^{6}=205$
    c. $64.2\times10^{7}=$ _____
    d. $15{,}000\times10^{-6}=$ _____
    e. $7.14\times$ ___ $=7{,}140{,}000$
    f. $8{,}450\times$ ___ $=.00845$

Unit conversion

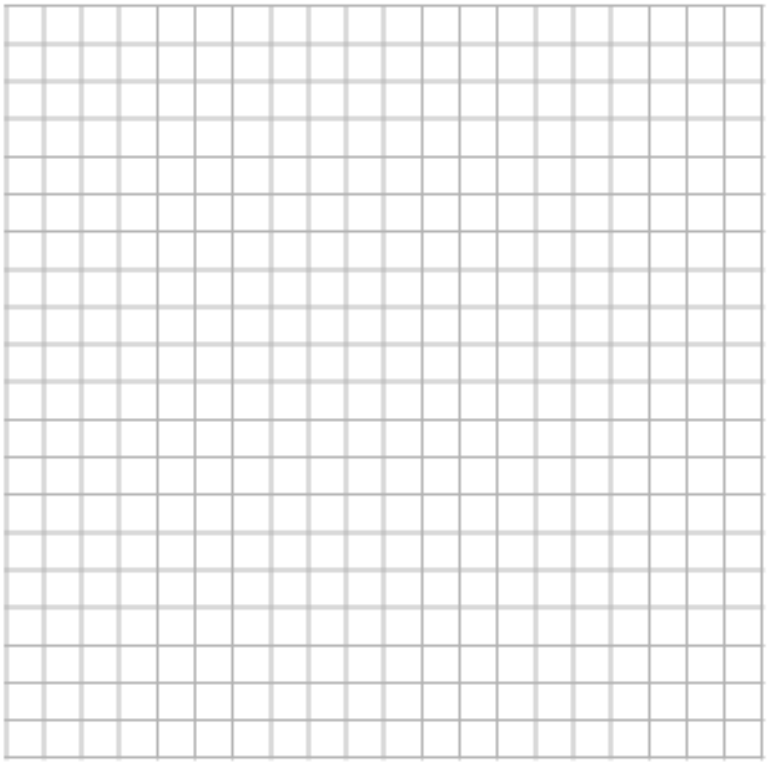
13. Convert 160 centimeters to
    a. meters
    b. millimeters
    c. kilometers
    d. inches
    e. feet

14. How many _____ are in one year? Write your answer in scientific notation.
    a. days
    b. hours
    c. minutes
    d. seconds

Variable Relationships

15. Consider the data in the table:
    a. Graph *y versus x.* (*y* on the vertical axis and *x* on the horizontal axis)
    b. Can you draw a straight line through the points?
    c. Is there a relationship between x and y?
    d. Can you write an equation relating x and y?

x	y
3	1
6	2
9	3
12	4
15	5



16. Consider the data in the table:
    a. Graph *b vs. a.* (the points with *b* on the vertical axis and *a* on the horizontal axis)
    b. Can you draw a straight line through the points?
    c. Is there a relationship between a and b?
    d. Can you write an equation relating a and b?

a	b
1	2
2	8
3	18
4	32
5	50