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AP Physics C
Summer Assignment

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Dear AP Physics Class,

Welcome to AP Physics! I am so excited for the year before us. In September we are going to have a lot of work ahead of us. To prepare I have some summer homework for you, which is meant for you to practice your math skills so that we can be prepared in the fall for the work ahead of us. You have five tasks:

1. **Complete this packet of math practice.**

2. **Vectors!** It is really important that you get comfortable adding and subtracting vectors as well as breaking them into components. I will put a reading online or watch this video https://www.youtube.com/watch?v=lbub7WDppCQ. Then complete these challenges online and submit screen shots in a Google Doc and submit it on google classroom (Class code: qmmpco)

    a. http://www.tandftechnology.com/Physics/Programs/Games/VectorTreasureHuntSimple/index.html

    b. http://www.tandftechnology.com/Physics/Programs/Games/VectorTreasureHunt/index.html

3. **Read chapters 1-3 and 12 in _The Physics of Superheros_ (It is on Google Classroom).** Choose a chapter from chapters 4, 7-10, 16-19 (you can choose an extra chapter for extra credit). For each chapter on the google doc with number 2:

    a. Summarize the chapter.
    b. List the interesting things you learned from the chapter.
    c. List at least one _misconception_ you had before reading the chapter and how this chapter _debunked t_he misconception.
    d. Submit it on google classroom (Class code: t1131d).

4. **Find one example of physics in something you do this summer** (for instance, Ms. Paul-Schultz might go canoeing in which that could be an example of Newton's 3rd Law because Ms. Paul-Schultz pushes on the water and therefore the water pushes on Ms. Paul-Schultz's canoe). Post it to google classroom. (Class code: t1131d)

5. **Review/Learn basic Physics.** You all are coming to this class with different levels of Physics. You must watch videos/read online to learn some basic Physics. If you want a textbook for the summer let Ms. Paul-Schultz know. Fill out this vocabulary log. Here is a site to get started with: https://sites.google.com/site/twuphysicslessons/

If you have any questions feel free to ask! My email is npaulschultz@bostonpublicschools.org

Have a good summer,
Ms. Paul-Schultz

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General Math Review

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Density Review

In physics, density functions are often used for charge densities, mass densities and current densities. Density is a measure of stuff per unit space. The one you are most familiar with is mass density is mass/volume. You can also have one and two dimensional densities.

Linear mass density $\lambda = \frac{m}{l}$ (mass/length)

Surface mass density $\sigma = \frac{m}{A}$ (mass/ area)

Volume mass density $\rho = \frac{m}{V}$
You can also replace the mass (m) for charge (q) to determine charge densities or current (I) to determine current densities.

Volume of a sphere: $\frac{4}{3} \pi r^3$

Surface area of a sphere: $4\pi r^2$

1. An iron sphere has a mass density of $\rho = 7.86$ x 10^3 kg/m^3 . If the sphere has a radius of 0.5 m, how much mass does the sphere contain?

2. A conducting sphere of radius 4m has 4µ C ($\mu = 10^{-6}$) of charge distributed on its surface (meaning only surface area). Find the surface charge density.

Isolating Variables

Often problems on the AP exam are done with variables only. Solve for the variable indicated. Don't let the different letters confuse you. Manipulate them algebraically as though they were numbers.

a. $v^2 = v_0^2 + 2a(x - x_0)$, a = _____

b. $T_p = 2\pi\sqrt{\frac{l}{g}}$, g = _____

c. $mgh = \frac{1}{2}mv^2$, v = _____

d. $B = \frac{\mu_0}{2\pi}\frac{I}{r}$, r = _____

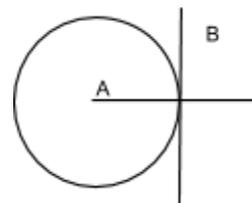e. $x_m = \frac{m\lambda L}{d}$, d = _____

f. $PV = nRT$, T = _____

g. $sin\theta_c = \frac{n_1}{n_2}$, θ_c = _____

h. $qV = \frac{1}{2}mv^2$, v= _____
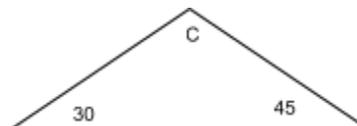
Geometry Review

1. Line B touches the circle at a single point. Line A extends through the center of the circle.
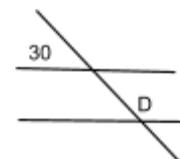
    i.   What is line B in reference to the circle? _____

    ii. How large is the angle between lines A and B? _____

2. What is angle C? _____

3. What is angle D? _____

4.. How large is E? _____