AP Physics Summer Assignment

Physics is a fascinating and challenging subject. To maximize our class time, students enrolled in AP Physics C must complete the following tasks prior to the beginning of the school year.

1.   Download the Mechanics textbook.

   https://ocw.mit.edu/ans7870/8/8.01/f16/readings/MIT8_01F16_TableOfContents.pdf

2.   Read the following sections from the Mechanics text and complete the corresponding reading guides that are included below. The reading guides are due the first day of class. A short review test covering this material will be given the first week of class.

Chapter	Section
1	1.1 Introduction
2	2.1 The Speed of Light 2.2 International System of Units (Pages 2-1 – 2-2 only) 2.3 Dimensions of Commonly Encountered Quantities
3	Entire chapter except for parts dealing with cylindrical coordinate systems and the last two example problems.

AP Physics
01. History and limitations of Classical Mechanics

Name: _____

1. _____ _____ is the mathematical science that studies the displacement of bodies under the action of forces.

2. Newton solved the greatest scientific problem of his time by applying his Universal Law of Gravitation to determine the _____ _____ _____ .

3. _____ _____ are now central to our study of mechanics,

4. Albert Einstein, by insisting on a fundamental rethinking of the concepts of _____ and _____ , was able to resolve the apparent conflicts between optics and Newtonian mechanics.

5. By the early part of the twentieth century, _____ _____ provided a mathematical description of microscopic phenomena in complete agreement with our empirical knowledge of all non-relativistic phenomena.

6. In the twentieth century, as experimental observations led to a more detailed knowledge of the large-scale properties of the universe, Newton's Universal Law of Gravitation no longer accurately modeled the observed universe and needed to be replaced by _____ _____ .

AP Physics C
02. Units, Dimensional Analysis, Problem Solving, Estimation, and Error Analysis

Name: _____

1. In 1983 the General Conference on Weights and Measures defined the speed of light to be

    c = _____ meters/second.

2. Complete the table.

    International System of Units

Base Quantity	Base Unit Name and abbreviation
Length	
Mass	
Time	
Electric Current	
Temperature	

3. The unit of _____ remains the only base unit in the International System of Units (SI) that is still defined in terms of a physical artifact.

4. Complete the table. Dimensions should be a combination of L = length, M = mass and T = time.

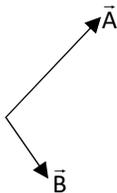 | Quantity | Dimension | MKS unit |
    |---|---|---|
    | Angle | | |
    | Area | | |
    | Volume | | |
    | Velocity | | |
    | Acceleration | | |
    | Density | | |
    | Force | | |
    | Work | | |

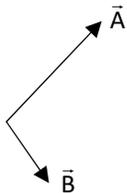**AP Physics C**
03. Vectors

Name: _____

1. Vectors have _____ and _____ .

2. Physical quantities such as mass and Temperature that have only a magnitude are called _____ .

3. Use geometric construction to complete the following operations.
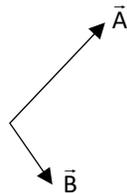
   a. $\vec{C} = \vec{A} + \vec{B}$

   b. $\vec{C} = \vec{A} - \vec{B}$

   c. $\vec{C} = \vec{B} - \vec{A}$

4. Complete the following operations.
   $\vec{A} = \langle 1, 2 \rangle \qquad \vec{B} = \langle 3, 4 \rangle$

   a. $\vec{C} = \vec{A} + \vec{B} = \langle _____, _____ \rangle \qquad |C| = _____ \qquad \theta = _____ °$

   b. $\vec{C} = \vec{A} - \vec{B} = \langle _____, _____ \rangle \qquad |C| = _____ \qquad \theta = _____ °$

5. Find the components of the vector.

   $|A| = 4 \quad \theta = 30° \qquad \vec{A} = \langle _____, _____ \rangle$

6. Complete the following operations.
   $\vec{A} = \langle -2, 5 \rangle \quad \vec{B} = \langle 2, -1 \rangle$

   a. $\vec{C} = \vec{A} \cdot \vec{B} = _____ \qquad$ The angle between $\vec{A}$ and $\vec{B}$ is _____ ° .

   b. $\vec{C} = \vec{A} \times \vec{B} = \langle _____, _____, _____ \rangle$