

**AP PHYSICS SUMMER ASSIGNMENT 2021 (AP PHYSICS 1 AND AP PHYSICS C)
INTRODUCTION: SKILLS REVIEW & THE NATURE OF PHYSICS**

DUE THE FIRST DAY OF SCHOOL!

Part A - Math Skills Review: on a separate sheet of paper, show your work for each problem and circle your answers. Clearly number each problem. Put "Math Review" and your name at the top right of each page.

1. **Scientific Notation:** find the answer to the following problems. Give your answer in scientific notation with the proper units.

a. $T_S = 2\pi \sqrt{\frac{4.5 \times 10^{-2} \text{ kg}}{2.0 \times 10^3 \text{ kg/s}^2}}$ Find T_S

b. $F = (9.0 \times 10^9 \frac{\text{Nm}^2}{\text{C}^2}) \frac{(3.2 \times 10^{-9} \text{ C})(9.6 \times 10^{-9} \text{ C})}{(0.32 \text{ m})^2}$ Find F

c. $\frac{1}{R_P} = \frac{1}{4.5 \times 10^2 \Omega} + \frac{1}{9.4 \times 10^2 \Omega}$ Find R_P

d. $K_{max} = (6.63 \times 10^{-34} \text{ Js})(7.09 \times 10^{14} \text{ s}) - 2.17 \times 10^{-19} \text{ J}$ Find K_{max}

e. $K = \frac{1}{2} (6.6 \times 10^2 \text{ kg})(2.11 \times 10^4 \text{ m/s})^2$ Find K

f. $1.33 \sin(25.0^\circ) = 1.50 \sin(\theta)$ Find θ

2. **Solving Equations:** Solve the equation for the variable indicated – rearrange the equation so the requested variable is on one side by itself. Simplify your answer – cancel out any variables that cancel out and combine like terms. Your answer will be an algebraic expression, not a number. Your answer should contain only the variables that are in the equation.

a. $K = \frac{1}{2} kx^2$ solve for x ($x = \underline{\hspace{2cm}}$)

b. $T_P = 2\pi \sqrt{\frac{L}{g}}$ solve for g

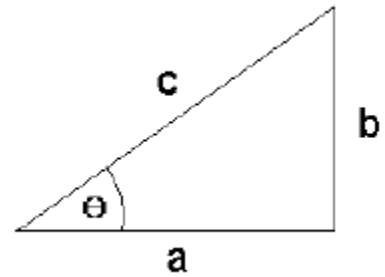
c. $F_g = G \frac{m_1 m_2}{r^2}$ solve for r

d. $mgh = \frac{1}{2} mv^2$ solve for v

e. $v^2 = v_0^2 + 2a(x - x_0)$ solve for x

$$f. \frac{L}{2} mg \sin \theta - \frac{3L}{4} T \sin \theta = \frac{1}{2} mL^2 \left(\frac{a}{L} \right) \quad \text{solve for } a$$

3. **Trigonometry:** Using the generic triangle to the right, basic trigonometry, and the Pythagorean theorem, solve the following.



- $\theta = 55^\circ$ and $c = 32$ m, find a and b
- $\theta = 45^\circ$ and $a = 15$ m/s, find b and c
- $\theta = 65^\circ$ and $b = 17.8$ cm, find a and c
- $a = 250$ m and $b = 180$ m, find c and θ
- $a = 25$ cm and $c = 32$ cm, find b and θ
- $b = 104$ m/s and $c = 65$ m/s, find a and θ

Part B – The Nature of Physics: Go to the OpenStax College Physics for AP Courses online textbook at

<https://openstax.org/books/college-physics-ap-courses/pages/1-connection-for-ap-r-courses>.

1. Study all sections of **Chapter 1:**

- 1.1 Physics: An introduction
- 1.2 Physical Quantities and Units
- 1.3 Accuracy, Precision and Significant Figures
- 1.4 Approximation

2. Answer **Conceptual Questions** #1-11

<https://openstax.org/books/college-physics-ap-courses/pages/1-conceptual-questions>

Answer in complete sentences. Clearly number each answer. Put “Conceptual Questions” and your name at the top right of each page.

3. Answer **Problems and Exercises** #1-36

<https://openstax.org/books/college-physics-ap-courses/pages/1-problems-exercises>

Show your work for each problem and circle your answers. Clearly number each question. Put “Problems and Exercises” and your name at the top right of each page.

To Turn In: Staple all your answer papers together. Put your name at the top right on each page. At the top left of the first page, put “AP Physics Summer Assignment 2021”. Have this ready to turn in on the first day of school.

Have Questions? Need Help?

Email Mr. Moehnke: rmoehnke@tusd.net

Send Mr. Moehnke questions through Remind: join our AP Physics Remind group by texting “@whsapphys” to 81010