

AP Physics 1 Summer Work 2021-2022

Google Classroom Codes for AP Physics 1 2021-2022

Period 1 - qhlo5rl

Period 3 - bblgfpX

The following summer assignment is designed to prepare students for the AP Physics 1 course by reviewing some previously learned skills. Each part must be handwritten or completed using the pen/markup feature in Kami.

No typed work will be accepted.

All math work must be shown for full credit (where applicable). Your first and last name must be on all pages of the assignment.

Due Date: August 17, 2021 (the second day of school).

The summer work focuses on four main skills that we will use in AP Physics 1.

1. Trigonometry
2. Metric Unit Conversions
3. Graphing
4. Formula Manipulation

These four are integral to many, if not all, of our units of study so it is important that you have a strong understanding of them.

1. Review Videos - links for videos are posted in the assignment on google classroom
Watch the videos listed below and take **five bullet point notes per video (or more)**.
There are 6 required videos, for a total of 30 bullet points (minimum).
For the videos designated as (OPTIONAL), you are not required to watch or take notes on these but they may be useful for extra review, practice or help with the worksheets.

Trigonometry

1. [Basic Trigonometry Review](#)
2. [Solving Word Problems Using Trig - Examples](#) (OPTIONAL)

Unit Conversions

1. [Metric Conversions](#)
2. [Conversion between metric units](#) (OPTIONAL)

Graphing

1. [Basics of Graphing](#)
2. [Interpreting Graphs](#)

Formula Manipulation

1. [Rearranging Equations in Physics](#)
2. [Combining Multiple Equations Using Substitution](#)

2. Review Worksheets

Complete the following worksheets (a copy of each is attached to the assignment posting in google classroom) by hand or using the pen/markup feature in Kami. **All math work must be shown for full credit.** Only including the answer will earn you half credit for that question(if it is correct).

1. Trigonometric Functions
2. Unit Conversions
3. Graphing
4. Formula Manipulation

Optional concepts to review:

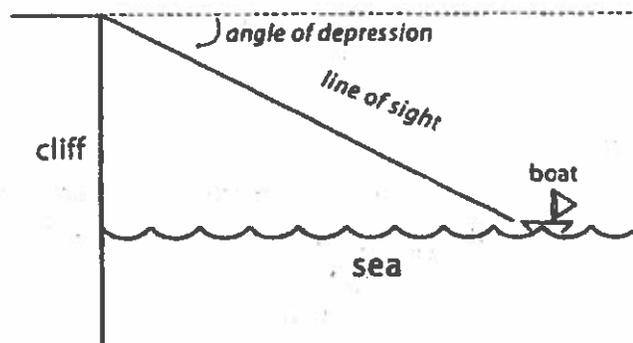
The use of significant figures will not be required in AP Physics 1, but we do need to recognize the purpose of significant figures. Use this link to review significant figures - [Significant Figures](#)

Scientific notation will not be required, but you will often see numbers given in scientific notation and/or want to express values in scientific notation. Use this link to review scientific notation - [Introduction to Scientific Notation](#)

Practice / Homework

1. A tree casts a 60 foot shadow. The angle of elevation is 30° . This is the angle at which you look up to the top of the tree from the ground. What is the height of the tree?
2. An observer is 120 feet from the base of a television tower which is 150 feet tall. Find, to the *nearest degree*, the angle of elevation of the top of the tower from the point where the observer is standing.
3. From the top of a vertical cliff which is 40 meters high, the angle of depression of an object that is level with the base of the cliff is 34° . How far is the object from the base of the cliff, to the *nearest meter*?
4. From the top of a cliff which is 450 feet above sea level, the angle of depression of a boat out at sea is 24 degrees. Find, to the *nearest foot*, the distance from the top of the cliff to the boat.

5. From a 200 feet high cliff a boat is noticed floundering at sea! The boat is approximately 300 yards from the base of the cliff. What is the angle of depression, to the *nearest degree*, of the line of sight to the boat?



Practice / Homework

1. The taut string of a kite makes an angle with the ground of 60 degrees. The length of the string is 400 feet. What is the height of the kite, to the *nearest tenth*?

2. A ladder, 500 cm long, leans against a building. If the angle between the ground and the ladder is 57 degrees, how far from the wall is the bottom of the ladder? Round the answer to the *nearest tenth*.
3. A kite is flying 115 ft above the ground. The length of the string to the kite is 150 ft, measured from the ground. Find the angle, to the *nearest degree*, that the string makes with the ground.
4. An observation tower is 75 m high. A support wire is attached to the tower 20 m from the top. If the support wire and the ground form an angle of 46 degrees, what is the length of the support wire, to the *nearest tenth*.
5. At a point 30 feet from the base of a tree, the angle formed with the ground looking to the top measures 53° . Find, to the *nearest foot*, the height of the tree.

Name: _____ Date: _____

Measuring Units Worksheet

Convert.

1 a. 2,000 m = _____ km

1 b. 9 km = _____ m

2 a. 9,000 ml = _____ L

2 b. 3 kg = _____ g

3 a. 6 L = _____ ml

3 b. 90 mm = _____ cm

4 a. 6 cm = _____ mm

4 b. 4 km = _____ m

5 a. 1,000 m = _____ km

5 b. 2,000 g = _____ kg

6 a. 50 mm = _____ cm

6 b. 400 cm = _____ m

7 a. 4 L = _____ ml

7 b. 3 km = _____ m

8 a. 10,000 g = _____ kg

8 b. 2 cm = _____ mm

9 a. 10,000 m = _____ km

9 b. 9,000 g = _____ kg

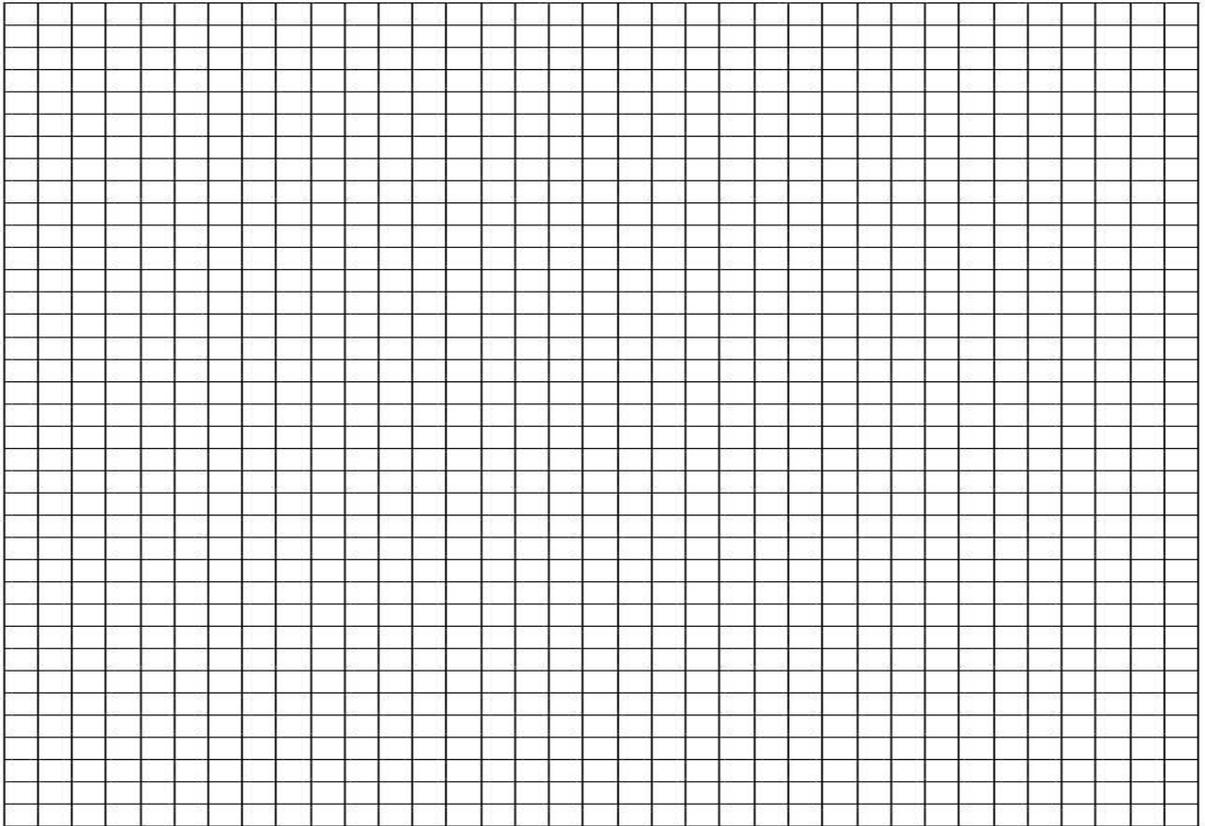
10 a. 4,000 g = _____ kg

10 b. 8,000 ml = _____ L

Graphing Review

1. Make a line graph for the set of data below. Label both the x (horizontal) and y (vertical) axis properly. Give the graph a title.

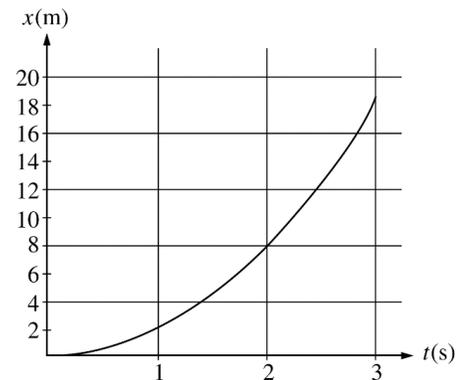
Cumulative amount of rainfall (mL)	Time (hour of the day)
5	1
7	2
19	3
26	4
30	5
38	6
40	7
41	8
47	9
50	10



- a. What can you say, in general, about the relationship between the cumulative amount of rainfall and the number of hours it has been raining?

- b. Is there a linear or non-linear relationship between the two? Support your answers using features of the graph and patterns(or lack of) in the data.

2. The graph below represents position x versus time t for an object being acted on by a constant force. The average speed during the interval between 1 s and 2 s is what? (speed = slope of a position vs. time graph). Show your work.



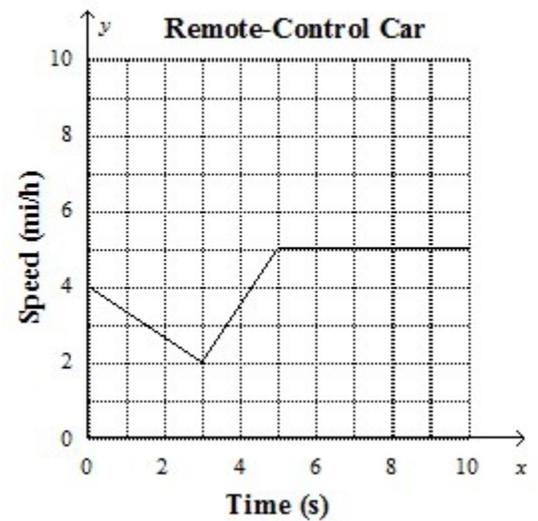
3. Use the graph to the right to answer the following questions.
1. What two variables is this graph comparing?
 2. How are the two variables related? (i.e. As x-value increases, what does the y-value do?)
 3. Describe the shape of the line (straight, diagonal, curved, etc.)
 4. From 2001 to 2004, by how much did the car decrease in value?
 5. Based on that timeline, determine the average decrease in value per year from 2001 to 2004. How did you find that?



6. Find the average change per year in value from 2001 to 2007. How did you do that?
7. Compare the average change in value from 2001 to 2007 to the changes in value between each individual year. Are they the same? What does this tell you about the amount of decrease in value per year (i.e. did it decrease more or less in some years compared to others?). How does the shape of the graph show that?

5. The graph to the right shows the speed of a remote control car over 10 s. Use this graph to answer the questions below.

1. Is the speed of the remote control car constant over the whole 10 seconds? How do you know that from the graph?
2. Describe the speed from 0-10 s. You do not need to mention the value of the speed, just how it is changing in each time period). How do you know this from the shape of the line graph?
3. Find the slope of the line from 0-3 seconds. What does the slope represent about the car's speed?
4. Find the slope of the line from 5-10 seconds. What does this value mean about the speed of the car?



Formula Manipulation

Rearrange the given formulas to create a formula for the specified variable. Upload a picture of your work in the space indicated below.

1. $y = x+a$; Rearrange to solve for a
2. $ax = y+z$; Rearrange to solve for a
3. $a(x+b) = c$; Rearrange to solve for b
4. $\frac{x}{a} + y = \frac{z}{b}$; Rearrange to solve for z
5. $y + a = \frac{b}{x}$; Rearrange to solve for x
6. $x - 3 = \sqrt{y}$; Rearrange to solve for y (not \sqrt{y})
7. $x^2 + a - 3 = y$; Rearrange to solve for x (not x^2)