

2021 USA Physics Olympiad Exam

Important Information to Student

Congratulations!

You are invited to participate in the 2021 USA Physics Olympiad Exam because you **scored 15 or more points** on the 2021 F=ma Exam. Along with the following, you will also receive a **USA Physics Olympiad Introduction** to help you prepare for the USAPhO and physics problem solving in general.

Thanks to [Dr. David Morin](#) (Harvard University) and [our generous sponsors](#), the top 40 USAPhO participants this year will receive a copy of *Introduction to Classical Mechanics* by Dr. Morin (if they don't already have a physical copy).

2021 USAPhO consists of two parts taking place on two separate days:

	Time allotted for problem-solving	Exam date and time
Part A	90 minutes	Monday, April 19, 4:00 pm – 5:30 pm Eastern time
Part B	90 minutes	Wednesday, April 21, 4:00 pm – 5:30 pm Eastern time

The exam is hosted by AAPT on the platform provided by Art of Problem Solving. For 2021 we ask that, as with the F=ma exam, only the students' high school science/physics teacher, or parent/guardian proctor the USAPhO exam.

Before the exam: Prior to the USAPhO (ideally a few days in advance), please make sure that you can log in to the exam page. It is important that you practice scanning/compressing several image files and compile them to a single pdf file. This is how you submit each problem of the exam. You will be allowed 20 minutes to complete file uploading.

To scan submissions, you may use a scanner or a smartphone with a camera or another device with a camera. Once you've scanned a PDF, you can either load the contest page and upload the PDF directly on the device that you're on or send the PDF to your computer (via AirDrop, Bluetooth, or another method) and upload the PDF file from your computer. Here are some recommended scanning applications:

- On Android devices, the Google Drive App has a scanning feature - On iOS devices, the Notes App has a scanning feature.
- Other apps that can be downloaded on iOS and Android devices are "Tiny Scanner" or "Cam Scanner"

At the beginning of the Exam: You shall be provided with blank papers both for your answers and scratch work, writing utensils, a hand-held calculator with memories/programs erased, and a computer for you to log into the USAPhO testing page, agree to the Honor Policy, and download the USAPhO exam papers.

At the end of the Exam: For every problem, scan or photograph each page of your solution, compile them into a single PDF file and upload them to the corresponding page on the testing platform. You are provided with a total of **20 minutes** to upload solutions to all of the problems in USAPhO.

It is important that:

1. You check that all your submissions are properly labelled, the images are legible and in correct order and orientation. USAPhO graders are not responsible for missing pages or illegible handwriting. No later submissions will be accepted.
2. Try to compress the PDF to ensure the file is at most 10MB; larger files could cause technical issues.

We strongly recommend practicing scanning before the contest to avoid issues on contest day. You can find a link to practice uploading on the [AoPS USAPhO contest page](#). If you're having issues finding a way to create PDF scans of contest submissions, please contact AoPS at info@artofproblemsolving.com.

- You have 90 minutes to complete Part A on April 19, and 90 minutes to complete Part B on April 21. Each question is worth 25 points, but they are not necessarily of the same difficulty.
- Show your work and reasoning. Partial credit will be given if you make your reasoning clear. See **USA Physics Olympiad Introduction** for more tips and advice.
- A hand-held calculator may be used. Its memory must be cleared of data and programs. You may use only the basic functions found on a simple scientific calculator. Calculators may not be shared. Cell phones or PDAs may not be used during the exam or while the exam papers are present. You must work on the exam independently without any help. You may not use any references or communicate with others. You may not access any part of the internet during the exam, except for the AoPS testing platform
- In order to maintain exam security, do not communicate any information about the questions of this exam, or their solutions until after **April 28th, 2021**.

The figure to the right shows some further guidance on formatting your solutions. Start each question on a new sheet of paper. Put your name, your proctor's name, the problem number, the page number and the total number of pages for this problem, in the upper right-hand corner of each page. As an example, the second page of your solution to B3 is shown to the right.

student	NAME
proctor	NAME
B3: 2/2	

Important Instructions for the Exam Supervisor

For 2021 we ask that, as with the $F=ma$ exam, only the students' high school science/physics teacher, or parent/guardian proctor the USAPhO exam. The exam may be proctored virtually if necessary.

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Students are allowed calculators, but they may not use symbolic math, programming, or graphical features of these calculators. Calculators may not be shared and their memory must be cleared of data and programs. Cell phones or PDAs may not be used during the exam or while the exam papers are present. Students must work on the exam independently without any help. They may not use any tables, books, or collections of formulas.