



## Tutorial Competition 2018

The CryptoClub Project is pleased to announce the 2018 CryptoClub Video Tutorial Competition. Students are encouraged to create video tutorials showing their solutions to the cryptography and mathematics problems given on the next page.

### Guidelines

Tutorials may be made by individual students or by groups of students. Videos should not contain names or faces that would identify individuals. Each video must be less than 5 minutes in length.

### How to make videos

Any audio-video recording technology can be used, including cameras that record audio and video of solutions as they are handwritten on paper, tablet apps such as *Explain Everything* that capture narrated solutions as they are written on tablets, and screen capture software such as *Screencast-O-Matic*. The last is useful to record audio and video of a problem being solved on the CryptoClub.org website.

**Register by:** April 15, 2018

Register [here](#), or at the Events section of the [CryptoClubProject website](#).

### Deadline

Videos can be submitted any time after April 20, 2018 until May 15, 2018.

### Judging

CryptoClub Project staff at the University of Chicago will evaluate tutorials according to correctness of solutions and clarity of explanation. They will determine awards in each of the following categories:

- Best explanation of cracking a cipher
- Best explanation of mathematics
- Best demonstration using the tools on CryptoClub.org
- Viewers' Choice Award - Participants who submit videos will have the opportunity to review videos submitted by others and vote to determine a Viewers' Choice Award.

Winners will be announced May 23, 2018.

### Prizes

Winners will receive a \$25 Amazon gift card.

## 2018 CryptoClub Tutorial Competition Problems

Choose one of the math problems or cryptography problems below as the topic of your video tutorial. Think about what parts of the problem might be confusing for others who are learning about the subject and then focus on those parts as you explain your solution. Your video must be less than 5 minutes long, so you might not have time to show the complete solution. However, you should show the final solution and all critical parts.

### Math Problems:

1. Show how to decrypt 21 18 25 25 2, which was encrypted with an additive cipher with key 14. Be sure to explain what you do if negative numbers come up and why. Explain so someone just learning about additive ciphers understands.
2. Explain how to reduce  $403 \pmod{26}$ . Include the reasons your method makes sense. Explain to your audience why this type of problem might come up in cryptography.
3. Give examples of numbers that make good keys for multiplicative ciphers and examples of numbers that do not make good keys. Explain what makes them good or bad keys. Your audience is students who are just learning about multiplicative ciphers.
4. Show how to construct the cipher table for an affine cipher with a key of your choice. Describe any patterns you see in the table.

### Cryptography Problems:

Crack one of the five messages on the 2018 Tutorial Competition Message Board on CryptoClub.org. Show how you cracked it in a video. Tell what key was used to encrypt and how you got it. To view the message board, go to the Challenges section of *cryptoclub.org* and click the "Join a Group" link. Join the 2018 Tutorial Competition Group with this information:

Group ID: 1264

Password: Video2018