

Low-tech ways to Communicate Math in a Pandemic

MATH 2415 Fall 2020

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How to Scan Your Paper Homework and Exams

1. To submit homework and exams you are advised to do *one* of the following:
 - (a) Write your solutions on paper so as to be legible once scanned, and use an app you can get for free on your phone like to create a **PDF scan** of your work. Make sure you have **ONE pdf file** to upload, which may have multiple pages. Do not submit separate files with scans of the different pages you wish to submit. Some such apps include **camscanner**, **abobe scan** and **tiny scan**. Make sure the quality of the scan is comparable to the scans I make of my [handwritten lecture notes](#).
 - (b) Write your solutions electronically using a tablet, iPad, etc. Your work must be legible. All pages should be collected into **one single PDF file**, not submitted as separate files.

2. With **camscanner** I do the following:
 - (a) Place the page to be scanned on a flat surface that has a contrasting color to the page and that is illuminated by natural light.
 - (b) From within **camscanner** select the **Docs** option on the menu near the bottom of the screen.
 - (c) Press the camera button at very bottom of screen.
 - (d) Depending on your lighting conditions, it may help to set the flash (top left icon) to on.
 - (e) Take a photo whose field of view is slightly larger than the page to be scanned. **camscanner** will hopefully automatically select the portion of the photo that contains the page. If not you can manually adjust it.
 - (f) Hit **Next** at which point **camscanner** will crop the image.
 - (g) Choose the **Magic Color** option and hit **Save**.
 - (h) Repeat for any subsequent pages.
 - (i) Use the sharing icon to save all pages scanned as a **single pdf file**. (This step is super important!)
 - (j) Email the pdf to yourself so you can upload it from your laptop into eLearning.

How to Interact in Problem Sections and Office Hours

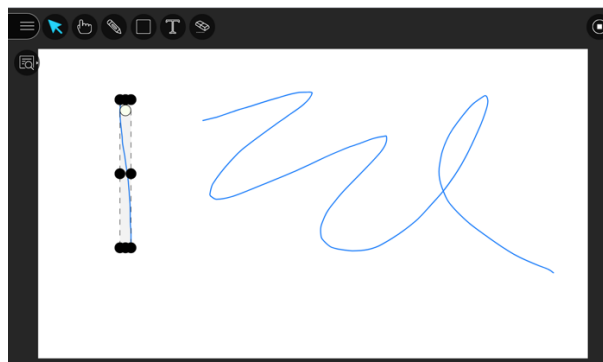
To enable you to communicate with people about math on the fly in real time it would be helpful if you can set and practice one of the following options. But do NOT spend any money to make this work.

1. We strongly recommend all students obtain a microphone and earplugs of some sort. You can buy ones that plug into a USB port on your computer. It is much better for you and your group to TALK during the problem sections than to interact via chat. One person can act as scribe for the discussion. You need to save a copy of your work for the GTA/ULA to look at when they visit your breakout room.
2. A simple option that works really well for **office hours and discussion forums**: Write your question on paper and scan it as above, or just take a photo on your phone. Send via email or post to forum.
3. Here is a comment from a PLTL leader which you may find helpful.

I think only one of my students out of both groups felt comfortable with writing digitally, and I noticed people were wasting time just getting frustrated writing with a mouse. To combat this, I forced them to stop using the whiteboard and verbally communicate with their partner (and me) their thought process as to how they were even going to approach the problem, and talk through the math while working it out on paper then they could flash their work to the camera or send a picture through GroupMe. I found that this really helped not only to get them to feel comfortable talking to one-another but was a good means of getting them to actually think about the math and more aware of their thought process rather than just starting a problem algebraically like many people are accustomed to. This also helped with the few students who still need to get a webcam working.

4. **Interacting in synchronous Problem Sections, Method One: BBC Whiteboard.** From within a Blackboard Collaborate video session in eLearning open the pink Collaborate Panel (bottom right) and select the Share Content icon (bottom panel, 3rd from left). Then choose **Share Blank Whiteboard**. You and others in your session you can all write on this same whiteboard using text entry or the “pen”. Note that you do not need a camera on your computer for this method. This method was successfully used for active learning in the MATH 2415 problem sessions this summer. Please take screenshots to record work done.
5. Here are the steps to select which parts of a Blackboard Collaborate virtual whiteboard you want to erase.:
 - Click on the select function (blue arrow in the image)
 - Select and click on the part that needs to be deleted as shown below.

- Press Delete on the keyboard.



6. Interacting in synchronous Problem Sections, Method Two: OneNote.

A very effective way to share math is for one student to share their screen, pull up OneNote and select the pencil, and then act as the scribe for the group. OneNote seems a lot easier to use than BBC's native whiteboard, and by using OneNote, you are able to save your work in a safe place. In addition, if you click on the SHARE button (top right) you can enter emails of other students in your group to share the file you are working on. You should start a new page for each problem. Theoretically at least, onenote pages are infinite in size. These features will help you share solutions with GTA/ULA and your group.

7. Other ways to share and communicate mathematics in active learning groups.

Everyone will be presenters during the problem session which involves sharing your solutions from your screen, app, cam, files, on the Collaborate white board, etc.

- You can share or mirror from a device that has a stylus (such as iPen, HP pen, or other) and an electronic white board from your tablet or computer to write.
- If you happen to have a document camera you can set that up to take video of yourself writing on paper or a white board and then share video as above. For that a thick dark marker or dry erase marker may help.
- If you have a webcam you can try writing on paper with a thick dark marker and sharing video stream as above.
- If you have access to Microsoft One Note, Photoshop, Paint, EasyCanvas, etc., you can use these instead of the Collaborate white board.
- If you have a tablet for writing but access Blackboard through a separate computer, you can buy the EasyCanvas app to use your tablet as an electronic whiteboard (compatible with your computer).
- Everyone will be able to write on the Collaborate white board at the same time. One person should not be doing all the writing.
- If there is another way of communicating or showing your work that is not listed here, then you may use those tools or apps after consulting with your TA.

Visualizing and Sketching Curves, Surfaces, and Solids

We will add new ideas here as we have work them out!

In the problem sections we will often ask you to sketch curves, surfaces, or solids by hand using the ideas in Dr. Zweck's [Lecture 6A: How To Sketch Quadric Surfaces](#).

Doing this on the Collaborate virtual whiteboard with a mouse is virtually impossible! Instead, we suggest suggest you draw your own sketches on paper or on a device that works for you. Then share your sketches with other group members via webcam or group chat and offer suggestions for improvement. That way you all learn the skill of hand sketching, which is often helpful as an aid to thinking.