Part I (due at the beginning of class Thursday, September 4)

Read the syllabus and write down your questions about it. Then, look through this rough outline of topics in Calculus I and complete the reading questions below.

Calculus I

1. Limits
   (a) numerical
   (b) graphical
   (c) algebraic
   (d) at infinity
   (e) continuity
   (f) Intermediate Value Theorem
   (g) Extreme Value Theorem
2. Derivatives
   (a) definition
   (b) interpretation as rates of change
   (c) equations of tangent lines
   (d) derivative rules
   (e) Mean Value Theorem
   (f) optimization
   (g) implicit differentiation
   (h) related rates
3. Integrals
   (a) antiderivatives
   (b) Riemann sums
   (c) Fundamental Theorem of Calculus
   (d) u-substitution

Remember that what you record for Part I should have 3 parts, as mentioned in the syllabus:

(a) Your responses to the reading questions below.

(b) Your own questions/comments on the reading.

(c) The amount of time you spent on Part I (including the time spent reading).

Reading Questions

1. (mentioned above) Write down your questions on the syllabus/course.
2. What did you like about Calculus I?
3. What topics/skills did you especially enjoy and why?
4. What topics/skills did you find challenging and why?
5. What topics/skills do you feel like you could use more practice with?

Part II: Problems (due at the beginning of class Tuesday, September 9)

1. Write a full, detailed solution to this problem from class on Tuesday, September 2: You have one 6-ounce glass and one 10-ounce glass and a big bucket of water. Can you get exactly 8 ounces of water in one of the glasses without wasting any water (i.e., no spilling/drinking/dumping; the amount of water in the bucket still needs to be present at the end, though possibly distributed among the bucket and the two glasses)?

   Work to ensure that your solution could be well understood by a classmate, using illustrations, tables, etc., as appropriate (check out the sample homework solutions on the last page of the syllabus for examples of how to write solutions). After your solution, also write a brief reflection on your problem-solving and solution-writing process for this problem: what things did you try that didn't work out? Where did you get stuck? What was easy to explain and what was hard to explain? What general problem solving approaches did you use that you could apply in other situations as well?

2. Write an automathography to help me understand your mathematics background. Below are some questions to help guide your writing. You may answer as many of these questions as you choose, but your automathography needs to be at least one single-spaced page long and should be a cohesive paper that flows well between topics, not a series of separate paragraphs responding to individual questions (though you should certainly use paragraphs). This assignment will be graded holistically and thus should be written with proper grammar and punctuation. It should address your personal experiences with mathematics and should be your own college-level writing. Your automathography is due at the beginning of class on **Tuesday, September 9**.

   - How would you define mathematics? Don't look it up in a dictionary—define it yourself.
   - Do you like some areas/aspects of math better than others? If so, which ones do you like or dislike? Why?
   - Describe your most memorable experience of learning mathematics.
   - Watch this pair of Michael Jordan short videos. St. Augustine of Hippo wrote "Fallor ergo sum," which translates to "I err, therefore I am." Considering these two examples, what do you think the role of failure and making mistakes is in learning? How does that apply to learning mathematics in particular?
   - What are the important questions mathematics asks?
   - What are the important questions mathematics is used to answer?
   - How do you think learning mathematics can inform your faith and how do you think your faith can inform your mathematical learning?

Note: I will consider giving a token for creative automathographies (e.g., a graphic novel, a children's book, a song, a poem, a video, etc., some of which may need to be handed in electronically instead of as a physical copy). If you choose a more creative approach to your automathography, you must ensure that it contains at least as much information as one single-spaced page would.