Course Description: Mathematics is one of humankind’s greatest cognitive endeavors, yet it raises many puzzling questions. Unlike much of our other knowledge, most mathematical knowledge is not established by gathering empirical evidence. So how is mathematical knowledge possible? Unlike most other things we consider to be real, mathematical objects are not physical objects. So in what sense do mathematical objects, such as numbers, exist? What are the foundations of mathematics? No prior knowledge of mathematics or philosophy is required.

Objectives:
We have three objectives in this course:
1. To improve your mathematical and philosophical literacy and proficiency.
2. To cultivate your critical thinking skills. By critical thinking skills, we include the abilities to recognize, analyze, and criticize arguments in the contexts of reading, writing, thinking, and discussion. We expect you to do this not only with others’ positions but, more importantly, with your own positions.
3. To encourage you to be active learners. By an active learner we mean a person who has the curiosity, confidence, and desire to take the initiative to seek information that will make the recognition, analysis, and criticism of arguments—once again, both others’ and your own—more poignant, penetrating, and insightful.

Evaluation:
We will meet our course objectives through problem sets, a paper, a final, and discussion. Here is the breakdown of their relative weights:
Problem Sets 35%
Paper 20%
Final 30%
Participation 15%

Alphabetic grades will then be assigned according to the following scale:

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
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</thead>
<tbody>
<tr>
<td>87.5-89.4</td>
<td>B+</td>
</tr>
<tr>
<td>77.5-79.4</td>
<td>C+</td>
</tr>
<tr>
<td>59.5-69.4</td>
<td>D</td>
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<tr>
<td>0-59.4</td>
<td>F</td>
</tr>
<tr>
<td>92.5-100.0</td>
<td>A</td>
</tr>
<tr>
<td>82.5-87.4</td>
<td>B</td>
</tr>
<tr>
<td>72.5-77.4</td>
<td>C</td>
</tr>
<tr>
<td>89.5-92.4</td>
<td>A-</td>
</tr>
<tr>
<td>79.5-82.4</td>
<td>B-</td>
</tr>
<tr>
<td>69.5-72.4</td>
<td>C-</td>
</tr>
</tbody>
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There is no rounding up or down of final grades. Rounding occurs only for the final grade, i.e., individual assignments, tests, etc. are not rounded.

A. Problem sets
Regular problem sets will be assigned to groups of students consisting (in most cases) of three members. One write-up is due from each group; all members will receive the same grade. Groups are welcome to get help from your two dedicated professors; however, no other sources—written, web-based, human, or otherwise—are allowed on these assignments. A good model is to work individually through the problems, and then meet to compare answers and discuss differences in the reasoning informing those answers.

B. Paper
A paper will be due at the beginning of Week 3. It will be 875 to 1450 words (approximately 3-5 pages using a standard 12-point font that is double-spaced.) This is an individual assignment, though you are encouraged to discuss your ideas with others. Here are some general guidelines for the paper:

1. Formatting: All written assignments should be double-spaced, standard margins, etc. You will automatically lose a third of a grade on any assignment that does not follow these guidelines. For citations, use Chicago Author-Date, which can be found here:
   
   [http://www.chicagomanualofstyle.org/16/ch15/ch15_toc.html](http://www.chicagomanualofstyle.org/16/ch15/ch15_toc.html)

2. Form: All writing assignments will be graded not only in virtue of content, but also in terms of spelling, grammar, and overall clarity. If we can’t understand what you’re saying, then we can’t assess the content of your claims. Additionally, writing clearly demonstrates greater understanding of the text.

3. Timeliness: All assignments should be submitted during the class on which they are due. Any assignment submitted late (i.e. after class) receives an automatic 3 percentage-point penalty. It will be penalized 3 percentage points for every subsequent day it is late. Hence, anyone submitting an assignment after class but on the same day in which it is due can earn no more than 97% of the total points; on the next day, 94%; on the next, 91%; etc. (See below about Dean’s Excuses.)

4. Content: All writing assignments must demonstrate sufficient understanding of the texts, including using only those parts of the text relevant to establishing your thesis. As writing good

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1 There are several brands of reference management software (EndNote, RefWorks, Zotero, etc.) Zotero is freeware; RefWorks is free to all Middlebury users. I strongly recommend that you acquire one of these programs and learn how to use it. All of the programs are relatively easy to use, and any one of them minimizes your chances of violating the [Honor Code](http://www.chicagomanualofstyle.org/16/ch15/ch15_toc.html).
philosophical papers isn’t the easiest thing to do, you’re always welcome to discuss your writing with us during office hours. Also visit Khalifa’s website for further guides:

http://khalifa.org

We also strongly recommend reading the following:


This is an excellent guide for learning how to write good philosophy papers, and will take you an afternoon to read.

C. Final

The parameters of the final will be determined at a later juncture in the course, and partly in response to how discussions evolve.

D. Participation

This is a general evaluation of the amount of effort and astuteness you have demonstrated to us in the course. Considerations that are relevant include promptness, attendance, quantity and quality of both contributions and questions in class sessions, responsiveness to other people’s comments in class, discussions outside of class, and appropriate class behavior. This grade reflects your performance in all of those areas of the course other than the graded, written assignments.

Despite the large size of this class, participation is still significant. If you simply attend all of the required courses, you will receive a 75 (C) on your participation grade. Here are some ways of improving that grade:

• *Asking questions about the material.* In general, we recommend taking note of two kinds of questions as you’re reading in preparation for a class:
  o What don’t you understand?
  o What do you disagree with?

It will help if you have passages and page numbers that sparked the confusion/disagreement.

• *Asking questions that go beyond the material.* There are both practical and philosophical issues that are not discussed in our texts. We REALLY want you to ask these questions, but with one caveat: let us summarize and field questions about the material first; then we can go beyond. Time constraints may limit our discussions of these issues, but we’re happy to talk shop during discussion sections and especially during office hours.

• *Answering your peers’ questions.* Some of you will find this material easier than others. For those of you who find this easy, don’t be passive, don’t get bored, etc. Rather, share your knowledge, especially when you have an answer to someone else’s questions.

• *Don’t be shy during discussion sections and office hours.* Some of you feel more comfortable in large lecture sections than others. For those who would rather not speak in front of your peers, feel free to swing by office hours or to use the discussion section to be more open with your thoughts and concerns.

Other policies

Dean’s Excuses: There are exceptions to the Timeliness rule. These include illness and family emergency. However, they do not include athletic, artistic, or recreational commitments. Crucial to your receiving full credit in any circumstances in which you are absent is that you demonstrate initiative and accountability to us, even under adverse conditions. Specifically, if you feel that you have a legitimate excuse for submitting your assignment later than the specified due date and without penalty, you MUST take the following actions:

(a) Wherever possible, you must speak with one of us prior to the due date of your assignment.

   Indeed, you should contact us as soon as you think that you have a legitimate excuse for a
tardy submission. If we judge that you failed to do this, you will be penalized for tardiness even if you follow the remaining instructions.

(b) For any assignment that counts for less than 10% of your final grade, you must initiate a conversation with us about how you will make up any assignments that you’ve missed. Failure to do so in a prompt manner will render you fully subject to the Timeliness rule.

(c) For any assignment that counts for 10% or more of your final grade, you must not only initiate a conversation with us about how you will make up any assignments that you’ve missed, but you must ALSO acquire a Dean’s Excuse. The Dean’s Excuse serves the following functions in this course:

(i) Official documentation to us that your reasons for handing in a tardy assignment are legitimate;

(ii) A mandate for you to initiate a conversation with us about how you will make up any assignments that you’ve missed.

(iii) A mandate for you to initiate this conversation as soon as possible. “As soon as possible” should be read “within a week in which we receive the Dean’s Excuse,” circumstances permitting. If you can attend class, then your circumstances permit you to speak with us about any work you need to make up.

A Dean’s Excuse does NOT serve the following functions in my course:

(i) A permission slip for you to hand in your assignment at your earliest convenience.

(ii) A mandate for us to seek you out in order to initiate a conversation with you about how you will make up any assignments that you’ve missed.

Failure to respect these guidelines will result in a reduction of your participation grade, AND your grade on any relevant assignment(s).

Objections to paper grades: If you object to a grade you receive on a paper, send an email with passages in your paper where you think I was being unfair. Provide reasons why my remarks for this passage were not fair. The email should also include times when you can meet over a one-week period. I will not discuss grades without reading an email first. This process should not be adversarial; rather, it is an extended application of your critical thinking skills. These policies are intended to facilitate clarity and communication, as well as to guarantee that I respond as thoughtfully as I can to your queries and concerns.

General expectations of student behavior: Participation also includes behaving like an adult. This includes exhibiting the virtues of civility, accountability, responsibility—particularly as these virtues apply to your education. For most of you, this is second nature. However, for the few of you who have not yet shed your adolescent tendencies, please note that failure to behave like an adult will be reflected in your participation grade. This includes taking the required initiative and responsibility of your workload in the event that you need a Dean’s Excuse (see below).

Khalifa’s crankiness about email etiquette/decorum: Different professors have different expectations about how they are addressed, and especially how they are addressed in email correspondences. My norms are “semiformal,” i.e. I expect some form of salutation with some acknowledgment that I’m a professor, but within those constraints, you can be fairly colloquial. For instance, the following are all perfectly good ways to start an email: “Dear Professor Khalifa,” “Hey Prof,” “Hi Dr. K,” “Howdy Most Esteemed Educator,” etc. What’s not acceptable is an email either lacking a salutation or failing to acknowledge the fact that I’m a professor. This reads as if I’m a waiter taking your order, which is not a good professor-student dynamic. Examples of bad email introductions include diving into your email without addressing me at all, “Hi,” “Hey,” “Hello,” “Hello Kareem,” “Khalifa,” “Hey Khalifa,” etc. Just so you know, I don’t reply to emails if they don’t follow these very basic rules of decorum. Similar rules apply in face-to-face interactions.
Also, a general rule: I don’t like to answer emails about logistical issues (how something will be graded, how to access a file, when something is due, etc.) in which the student could have read the syllabus, searched the internet, or asked a classmate in roughly the same amount of time it would take them to write and wait for a reply to an email. This is not a good use of your time (since you often could get the answer to your question more quickly with a little more effort) and it’s definitely not a good use of my time. If I do not reply to an email within 24 hours, assume that you’re guilty of this offense, and don’t expect a reply from me.

**ADA Statement:** Middlebury College seeks to provide reasonable accommodations for qualified individuals with documented disabilities. If you need an accommodation because of a documented disability, please contact Jodi Litchfield in the Office of Student Accessibility Services. Please do so at the beginning of the semester.

**Honor code:** You are expected to abide by all the rules of Middlebury College’s honor code. Failure to do so will lead to reporting you to the proper university authorities.

**Texts:**

All other required readings are available electronically. They can be found in the course folder:

afp://classes.middlebury.edu/Winter15/MATH1015A/HANDOUTS

If you’re unfamiliar with course folders, go to:
http://mediawiki.middlebury.edu/wiki/LIS/File_Servers - Connecting_to_File_Servers

**Schedule of readings and assignments:**
Each class reading and assignment can be found at the class website, which is located here:
http://w15.middlebury.edu/MATH1015A/

We have only posted the first half of the course. This is an acknowledgment that we are embarking on an unpredictable interdisciplinary adventure. We are a large group with diverse academic backgrounds and interest, so it seems prudent to maintain some flexibility as we move ahead. We appreciate the intellectually adventurous attitude you have demonstrated in signing up for this course, and we look forward to a great trip.