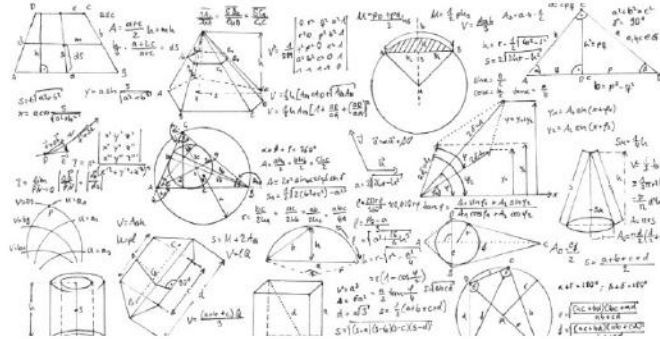


Applying to Graduate School in Mathematics

Department of Mathematics
University of California, San Diego

2016-10-31 (revised 2016-11-17)



Undergraduate School versus Graduate School

- **Undergraduate school:** You...
 - ① Take many introductory courses for broad exposure to major
 - ② Might take some intermediate courses in your discipline
 - ③ Take general education courses from assorted fields
- **Graduate school:** You...
 - ① Take advanced courses from your major in specialized area(s)
 - ② Get approval from faculty advisor on all coursework
 - ③ Do *not* need to take general education courses
 - ④ Either (a) complete lengthy research project for your faculty advisor and defend results (definitely required for Ph. D. level) OR (b) take comprehensive examination based on coursework (for some master's programs)

Why Consider Graduate School?

- To demonstrate yourself as an advanced student in a specialized subject matter or to be trained as researcher
- Some occupations require graduate degrees; others pay higher salaries to people with graduate degrees from reputable institutions
- To put yourself in smaller group of job-seekers seeking same jobs

(Undergraduate degrees remain good option for many people compared to only high school. However, due to prevalence of undergraduate degrees, competition for jobs is high.)

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Basics

- *Graduate school is not ideal for everyone*
- If graduate school is good option for you, never too early to start planning
- Applying to reputable graduate programs take lots of time; taking GRE tests requires months (maybe ½+ year) to study for; (you'll surely need General Test and maybe Mathematics test)
- Successfully applying to graduate school is significantly impacted by your relationships with faculty members from whom you will need letters of recommendation

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How to (and not) Think About Graduate School

- Earning *undergraduate* degree does *not* guarantee any particular future job
- Earning *graduate* degree also does *not* guarantee any particular future job
- Degree from *reputable* graduate program *might* put you in smaller pool of people competing for employment
- Degree from *reputable* graduate program *might* qualify you for higher-level starting jobs / salaries

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Types of Graduate Degrees (1/2): Academic

- Examples of **academic degrees**:
 - Master of Arts (M.A.); Master of Science (M.S.)
 - Doctor of Philosophy (Ph.D.); usually includes earning masters degree
- In master's programs, you might take courses and do research, or only take courses and then take comprehensive examination; with M.A. or M.S. degree you *can* work in industry, however academic degrees generally stress academic theory over practice.
- Master's degrees are better for some career plans
- Ph.D. is research-oriented degree for people wanting to become faculty members or researchers in government or private industry; to earn Ph.D., you must contribute new knowledge to your discipline via research, write dissertation, and defend findings before committee of faculty members

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Types of Graduate Degrees (2/2): Professional

- **Professional degrees** stress practice over theory; prepare people for working in the field
 - Examples of professional degrees:
 - Doctor of Medicine (M.D.)
 - Juris Doctor (J.D.)
 - Doctor of Psychology (Psy.D.)
 - Master of Education (M.Ed.)
 - Doctor of Education (Ed.D.)
 - Master of Advanced Study (M.A.S.)
 - Master of Business Administration (M.B.A.)
 - Above degrees generally do *not* involve producing new knowledge resulting from research
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- Remainder of this presentation focuses on *academic* graduate degrees

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Duration of Graduate School

- Academic *masters* degrees typically take ≈ 2 years to complete
- Academic *doctoral* degrees typically take ≈ 5 years to complete
- Time to complete a graduate degree can take longer if problems with research

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Cost of Graduate School

- Graduate school for *academic* degree majors might not cost so much more than undergraduate degree majors
- UC San Diego in-state student resident tuition for 2016–2017 academic year (excluding summer) for *academic* programs:
 - Undergraduate students: \$15 822.87
 - Graduate students: \$16 730.77
- (Graduate school for *professional* programs can cost significantly more than undergraduate school)

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Funding for Graduate School

- With teaching assistant (TA) assignments and/or graduate student researcher (GSR) positions...
 - Academic master's students *might* be able to finance nearly all educational costs (and basic living expenses)
 - Academic doctoral students *should* be able to finance nearly all educational costs (and basic living expenses)
- Teaching assistantships normally either 25% or 50% load of full-time (40 h/week) work. In 2016–2017 academic year...
 - UC San Diego tuition remission for in-state graduate student TA's covers ≈95% of tuition & health insurance regardless of load
 - UC San Diego wages for graduate student TA's: \$1 113.95/month for 25% load; \$2 227.89/month for 50% load

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Applying for Graduate School

- *Undergraduate* school applicants usually vetted by university, not college nor academic department
- *Graduate* school applicants vetted by university and by academic department faculty members
- University graduate division reviews undergraduate transcripts and standardized (GRE) testing scores, collects application fee, and facilitates department receipt of application materials
- Faculty members in department you apply to will review your application and recommend for or against accepting you

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Academic Graduate School Application Materials

- Academic graduate school programs typically require:
 - Online application form
 - Payment of application fee (be ready to pay \$100+)
 - Transmission of standardized (GRE) test scores
 - Transmission of undergraduate school transcript(s)
 - Record of preparatory coursework
 - Letters of recommendation (most /all from faculty members)
 - Statement of purpose
 - Financial aid statement
 - Other documents, answers to questions

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What Faculty Members Reviewing Applications Want to Know

- Most departments accept far fewer graduate students than undergraduates. (In 2016–2017, UC San Diego mathematics department has 2 500+ undergraduate students and 130+ graduate students)
- Faculty want applicants who can intellectually handle graduate work and will earn degree in reasonable time; how well did you do in preparatory courses?
- For mathematics Ph.D. programs, mathematics departments normally fund students. Faculty members do not want to see money wasted. Thus, they are picky about which applicants they accept.
- Faculty on admissions committee want applicants who are highly recommended by faculty at their undergraduate departments.

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Standardized Testing

- Most academic graduate programs require applicants to take General Record Examination (GRE) General Test. See ets.org; test lasts ≈3.5 h; daily, intensive preparation over many months is encouraged
- Some programs also require GRE subject test; offered few times/yr (April, October, November); based on deep content from range of undergraduate study
- For mathematics subject test, daily studying over many months recommended; advice: take test in April of undergraduate junior year
- **Caution: GRE scores expire after 5 years**
- If you don't get accepted to a graduate program, ask program personnel to keep your GRE score; otherwise, if you apply again in future, you'll have to pay to have scores re-sent to program

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Undergraduate Schoolwork and Transcripts

- Consult web sites of graduate programs you're interested in for additional preparatory coursework you should take; example: UC San Diego Department of Mathematics faculty want applicants to take MATH 100A–B–C and MATH 140A–B–C or equivalent
- Your grades in all major coursework should be impressive
- Taking relevant graduate-level courses while undergraduate may strengthen your application *if you perform excellently in them*

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Letters of Recommendation

- Typically 3 letters required from faculty who can speak in detail about your aptitude for graduate study and likelihood to do exceptionally well; *over long period of time*, you need to have shown professors your capabilities
- Doing research (example: in department's undergraduate honors program) can (1) show your capability/interest in research and (2) lead to letter of recommendation from faculty you work under
- Only excellent recommendations are valuable; if a faculty member is unable/unwilling to write excellent letter, his/her letter might do more harm than good
- Give faculty members ample time to write letters for you

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Personal Statement

- This is your chance in writing to speak to faculty admissions committee members reviewing your application; use it wisely; *be cautious if disclosing details about personal matters*
- Are you academically mature, intellectually capable, and serious enough about the graduate program being applied to? If the answer to each is "Yes", this should be clear from your personal statement.
- Aim for substance over length; allow enough time (months?) to prepare your statement; expect many revisions
- Ask multiple people, including faculty members you know/trust from your undergraduate school, to read drafts of statement

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Financial Aid

- Depending on department, academic graduate programs may have funding available by grants/fellowships (in addition to TA and/or GSR funding)
- To apply for this funding, you need to convince reviewers of your graduate school application why you should be awarded money; your answers to questions or essay should be substantive and relevant, but not unnecessarily lengthy
- You are competing with many other students for money; your comments need to be convincing; have them proofread by trusted qualified sources

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Choosing a Graduate Program

- Remember, applying to graduate school is applying to a specific department
- Consider reputation of *department* and specific faculty members in your field of interest, not how famous university or campus might be for sports teams; don't randomly apply to programs
- Don't put all hopes in one graduate program
- Generally wise to do graduate study at different institution or campus than undergraduate study (1) so that all your exposure to subject is not shaped by one department, and (2) because faculty may have trouble accepting you as graduate student after only knowing you as undergraduate student

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Current Graduate Student Panel Discussion

- Undergraduate years:
 - What smart things did you do as an undergraduate student that you think helped you get into graduate school?
- Application to graduate school:
 - How much work did you put into choosing programs to apply to?
 - What do you think helped your application appeal to faculty members on admissions committees?
- Now that you are in graduate school:
 - What has been nice (or not) about being a graduate student?
 - How do you think a person should go about deciding whether s/he is right for graduate school in mathematics?

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