# Math 15000: Math for the Contemporary World Winter 2025

# LECTURE INFORMATION:

- Mondays, Tuesdays & Thursdays, NAC 6/113, 10–1:20PM, SECTION WS
- Exam 1: Thursday, Jan 9<sup>th</sup>
- Exam 2: Thursday, Jan 16<sup>th</sup>
- FINAL EXAM: Thursday 23 January

# LECTURER INFORMATION:

- Dr. Matthew Auth, Doctoral Lecturer, Dept. of Mathematics, City College
- E-mail: mauth@ccny.cuny.edu
- Office Hours: Wednesdays 8-9pm Blackboard Collab Ultra

GRADING POLICY (see section on Exams):

- Exams 1,2: 20% each
- Projects 1,2 10% each
- HW 1-2: 10% each
- Final: 40%

## COURSE DESCRIPTION:

Bombarded by statistics, assailed by advertisers and advocates of all persuasions, the average person needs mathematics to make sense of the world. This course aims to give students the tools needed to critically examine the quantitative issues of our times. Students will learn the basics of logical reasoning, the use of graphs and algebra to create quantitative models, and the role of statistics and probability in analyzing data. We will apply these ideas to assess the quantitative claims raised in contemporary case studies commonly discussed in the media. 3 hr./wk; 3 cr.

## SUPPLEMENTARY MATERIALS:

- Texts:
  - <u>Using and Understanding Mathematics</u>, 7<sup>th</sup> Edition
  - ~By Bennett and Briggs
  - ~Published By Pearson
- Non-programmable calculator (scientific, TI-83, TI-84 permitted)

#### HOMEWORK:

Homework will be submitted to Gradescope.

#### MIDTERM EXAMS:

Two midterm exams will be given during the course. A student who misses a midterm can use his/her final exam grade to make-up the missed midterm. There will be plenty of midterm type exam questions on the final so I will be able to judge your midterm exam performance by your final exam score. In fact I will allow ALL students to replace any (or all) midterm exam grades by his/her final exam grade if the student's final exam grade is superior to the midterm.

The focus of each exam will be confirmed prior to each exam. Problems on exams will be similar (sometimes identical) to those in examples and exercises from our testbook.

#### FINAL EXAM:

The final is cumulative and counts for a significant portion of your grade. A good way to study for the final is to download the old final exams for Math 150 off the math department website.

Also, a set of project sample ideas will be supplied at the beginning of the semester. There is one optional project for each of the three units. Satisfactory completion of a project by the indicated deadlines will allow you to bank up to 10 points for the final. Since there are three units, you can acquire up to 30 points on the final in advance of the final.

If you miss the final, you must present your case (if you feel you have one) to me in order to take a makeup exam.

#### STUDENTS WITH DISABILITIES:

Students with physical or emotional disabilities should contact the **Office of Student Disability Services** in NAC 1/218, 212-650-5913. If the office determines that a student's situation warrants special accommodations, I will be certain to make them.

Pathways Learning Outcomes – Each of the following general education goals is addressed to some degree in each unit of this course.

• Interpret and draw appropriate inferences from quantitative representations, such as formulas, graphs, or tables.

• Use algebraic, numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems.

• Represent quantitative problems expressed in natural language in a suitable mathematical format.

• Effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form.

• Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation.

• Apply mathematical methods to problems in other fields of study.

# Math 150 Recommended Textbook Exercises

# (Review Questions unless otherwise noted; exercises in parentheses optional)

Section	Review Questions (in 7 <sup>th</sup> Edition)
1C (page 36 in physical copy, page 70 in pdf) Sets and Venn Diagrams	29-36, 45-52, 61-70
1D (page 51 in physical copy, page 85 in pdf) Analyzing Arguments	23-47 odd, 49-51, (67)
2A (page 85 in physical copy, page 119 in pdf) Understand, Solve, and Explain	7-12, (13-18), 19-39 odd, 45-54, 60, 66, 67
2B (page 102 in physical copy, page 136 in pdf) Extending Unit Analysis	7-14, 17, 20-30, 37, 53, 64, 66, 94
3A (page 136 in physical copy, page 170 in pdf) Uses and Abuses of Percentages	8-10, 31-73 odd
3B (page 151 in physical copy, page 185 in pdf) Putting Numbers in Perspective	15-26, 55-62
3D (page 175 in physical copy, page 209 in pdf) Index Numbers: The CPI and Beyond	11-33 odd, (44)
5A (page 305 in physical copy, page 339 in pdf) Fundamentals of Statistics	9-19 odd, 27-39 odd, 47-50
5B (page 316 in physical copy, page 350 in pdf) Should You Believe a Statistical Study?	9, 12, 14, 30, 41, 43, 45, 46
5C (page 329 in physical copy, page 363 in pdf) Statistical Tables and Graphs	13-25, 27, 35, 36
5D (page 346 in physical copy, page 380 in pdf) Graphics in the Media	15, 21, 24, 35, 36, 45
6A (page 383 in physical copy, page 417 in pdf) Characterizing Data	13-20, 27, 35, 37
6B (page 394 in physical copy, page 428 in pdf) Measures of Variation	15-20
6C (page 406 in physical copy, page 440 in pdf) The Normal Distribution	15, 19, 29, 37, 41-47
6D (page 419 in physical copy, page 453 in pdf) Statistical Inference	Instructor's discretion (optional section)

8A (page 497 in physical copy, page 531 in pdf) Growth: Linear vs. Exponential	9-16, 31
8B (page 507 in physical copy, page 541 in pdf) Doubling Time and Half-Life	9-12, 25-32, 41-48 (use graphing to illustrate any problems that require logs; omit such problems on exam, but include in lessons for illustration)
9A (page 51 in physical copy, page 85 in pdf) Functions: The Building Blocks of Mathematical Models	9, 10, 13, 24
9B (page 51 in physical copy, page 85 in pdf) Linear Modeling	11-16, 17-47 odd
9C (page 571 in physical copy, page 605 in pdf) Exponential Modeling	27-36

### **Project Format – Please follow this format for each project to ensure full credit.** All components should be in your own words.

- 1) Title (1 point)
- 2) Introduction (2 points)
- 3) Relevance to the unit (2 points)
- 4) Summary of results found (2 points)
- 5) Three questions to explore using unit tools to enrich/explain findings (2 points)
- 6) References (1 point)

## Example (for Unit 2)

- 1) Ice Cream Consumption in Top Ten Countries
- 2) Ice cream is consumed worldwide. However, each country consumes ice cream in different amounts...
- 3) In this unit, we explore analyzing data sets by their mean, median, quartiles, mode, range, and standard deviation. These quantities can be studied in connection with ice cream consumption because ice cream consumption can be measured numerically.
- 4) Ice cream consumption is highest in New Zealand, followed by the US, Australia and Finland. The average of per capita ice cream consumption across the ten countries is \_\_\_\_\_, the median is \_\_\_\_\_, the mode is \_\_\_\_\_, the range is \_\_\_\_\_\_, and the standard deviation is \_\_\_\_\_\_. We can also create a box-and-whisker plot as follows... (insert image)
- 5) Three (possible) questions
  - a. What is the total consumption of ice cream per country?
  - b. Are average temperatures higher in places with higher ice cream consumption?
  - c. Do the quantities listed at the references factor in waste?
- 6) References

- a. <u>https://www.worldatlas.com/articles/the-top-ice-cream-consuming-coun</u> <u>tries-of-the-world.html</u>
- b. <u>https://www.businessinsider.com/global-ice-cream-consumption-per-cap</u> <u>ita-2013-1</u>