Math 100 Signature Assignment

Course Project, Spring 2020

Signature assignment: Write a 2- to 3-page (double-spaced) essay on a topic chosen from the following three categories/options. A brief oral presentation (to be recorded and uploaded to Canvas) is also required.

Option 1: Analyzing data-based (statistical) study
Option 2: Presenting a mathematical application/topic in any field
Option 3: Summarizing the life of a mathematician

See examples and more details on these options in the following pages.

Once you decide on your topic, you must email your instructor and get your topic approved. Do not just put some facts together. Keep it organized, clear, and precise.

This is a major assignment for 50 points (35 pts. for the written portion; 15 pts. for the presentation), worth10% of your overall semester grade.

[Details of the assignment]

- It can be an individual project (by yourself) or a two-person joint project (you and one other person). If it is a joint project, both students must make significant contribution.
- Each individual/group must turn in a brief formal paper, 2 to 3 pages long, double-spaced. You may use any standard style. Be sure to cite your source(s).
- Each individual/group must make a brief oral presentation, 2 to 3 minutes long, record it, and submit it via Canvas. Use of a visual aid (such as PowerPoint or graphs) is strongly encouraged. You may use your own camera, phone, or Zoom to record the presentation.
- Your presentation does not have to be perfect—do not spend a lot of time on recording. All I want to see is you doing a presentation as if you were presenting to the class face-to-face.
- If you have no video-recording device (no camera phone, camcorder, or webcam), please contact me; I will make a special arrangement via Zoom or phone to discuss technology.
- Start early. The first step is to contact me with your topic and plans. I will be happy to give you guidance and suggestions. DO NOT WAIT until the last minute.
- The project is due on May 24, 2020. (That's 10 days after our last class lecture, Lesson 21.)

Now, pick an option and a topic from the following three pages.

Option 1: Data-based study in the news, magazine, paper, or social media. Analyze the study, identify the type of study (experiment vs. observational), population, sample, use of a placebo, potential bias, validity of logic, use or misuse of statistics, possible fallacies involved, etc. and determine if the conclusion is valid. The focus should be analyzing its reliability critically from statistical and logical standpoints, using what we learned in Ch. 5 and Ch. 1. Here are sample topics under this option. Find some statistical or quantitative study on

- Recreational use of marijuana—for or against?
- Danger of vaping—how bad is it?
- COVID-19--vaccination, stay-at-home policy, economic impact, death rates, etc.
- Gun control and gun violence—more restrictions or not?
- Vaccination for children—mandatory or optional?
- Safety of football (or another sport)—how serious is the problem?
- Police brutality, violence against police officers—what are the facts?
- College tuition and student loans—what are some implications for future students?
- Movie industry—how big is it? Will it stay big?
- Secret for living long—what are they? Sure?

Tentative Grading Rubric (out of 50 points)

Points	Details to be included in the project & presentation	
Paper	**2- to 3-page paper. 35 pts.**	
5	The topic was approved by the instructor in advance, and the work has been carefully prepared (not put together in a rush).	
5	Sources are well-documented.	
20	The essay contains an accurate summary of the data as well as YOUR analysis of the study from logical and statistical perspective.	
3	The format and the length are as specified in the instructions.	
2	The writing is grammatically correct, including spelling and punctuation.	
Comments:	Points for the Paper:	
Presentation	**Between 2 and 3 minutes. 15 pts.**	
5	The length is as specified, and the contents are consistent with your essay. (Penalties apply if over 3 minutes)	
5	The data and conclusions are presented in a logical and clear manner.	
5	The presenter used appropriate language and accurate terminology.	
Comments:	Points for the Presentation:	
	Total Points:	

Option 2: Any mathematical topic contained in the book or some other creative topic related to mathematics, including topics on art, music, history, government, politics, finance, media, sociology, etc. as related to mathematical ideas. Here are some examples:

- Gerrymandering (politics)
- Electoral college (politics)
- Fractals (art)
- Animation and computer graphics
- Musical scales, chords, and mathematics
- Four-Color Theorem (Sec. 9.1)
- Infinity/infinities (Sec. 9.2)
- Seven Bridges of Konigsberg (Sec. 9.3)
- Russell's Paradox (Sec. 9.4)
- Non-Euclidean Geometry (Sec. 9.5)

Tentative Grading Rubric (out of 50 points)

Points	Details to be included in the project & presentation	
Paper	**2- to 3-page paper. 35 pts.**	
5	The topic was approved by the instructor in advance, and the work has been carefully prepared (not put together in a rush).	
5	Sources are well-documented.	
20	The essay contains enough quantity of accurate mathematical content (the information presented must be sufficient and correct).	
3	The format and the length are as specified in the instructions.	
2	The writing is grammatically correct, including spelling and punctuation.	
Comments:	Points for the Paper:	
Presentation	**Between 2 and 3 minutes. 15 pts.**	
5	The length is as specified, and the contents are consistent with the paper written on the topic. (Penalties apply if over 3 minutes)	
5	The contents are presented in a logical and clear manner.	
5	The presenter used appropriate language and accurate terminology.	
Comments:	Points for the Presentation:	
	Total Points:	

Option 3: Biographical study on the life of a mathematician. Find a mathematician and write about his/her background, life, accomplishments, etc. Be sure to explain the mathematical achievement, and make sure you have enough content for at least two pages. You may include your thoughts as well. Here are some exciting suggestions as examples (and what makes them interesting):

- Archimedes (military strategist. How did he die?)
- Euclid (the ancient father of geometry, somewhat mysterious)
- Pythagoras (a philosopher, the father of music theory, a religious guru)
- Gerolamo Cardano (a doctor, gambler, jerk, prophet, or what?)
- Carl F. Gauss (probably the most famous in history)
- Bertrand Russell (Nobel Prize winner, in what field?)
- John Nash (the main character in the film *Beautiful Mind*)
- Leonhard Euler (prolific even after becoming blind)
- Niels Henrik Abel (tragic short life)
- Evariste Galois (even more tragic and shorter life)
- Georg Cantor (brilliant yet very sad)
- Kurt Godel (He proved what?? And how did he die?)
- Paul Erdos (very eccentric, strange… and he died not long ago)
- Grigori Perelman (He still lives…, but no one seems to know where.)

Tentative Grading Rubric (out of 50 points)

Points	**Details to be included in the project & presentation**	
Paper	**2- to 3-page paper. 35 pts.**	
5	The topic was approved by the instructor in advance, and the work has been carefully prepared (not put together in a rush).	
5	Sources are well-documented.	
20	The paper contains both the human aspect and the mathematical achievement associated with the mathematician.	
3	The format and the length are as specified in the instructions.	
2	The writing is grammatically correct, including spelling and punctuation.	
Comments:	Points for the Paper:	
Presentation	**Between 2 and 3 minutes. 15 pts.**	
5	The length is as specified, and the contents are consistent with the paper written on the topic. (Penalties apply if over 3 minutes)	
5	The biography is presented in a logical and clear manner.	
5	The presenter used appropriate language and accurate terminology.	
Comments:	Points for the Presentation:	
	Total Points:	