

Normal Systems
Spring 2023
Final Exam

Name (Print): _____

NetID: _____

This exam consists of 3 pages (not including this cover page) and 17 problems. Check to see if any pages are missing. Enter all requested information at the top of this page, and put your NetID at the top of every page in case the pages become separated.

The exam is open note. You may use a non-programmable calculator on this exam.

You are required to show your work on each problem on this exam. The following rules apply:

- **Organize your work** in a reasonably clear and coherent way in the space provided. Work scattered all over the page without clear ordering will receive very little credit.
- **Mysterious or unsupported answers will not receive full credit.** A correct answer, unsupported by calculations, explanation, or algebraic work will receive no credit; an incorrect answer supported by substantially correct calculations and explanations might still receive partial credit.
- If you need more space, ask us for scratch paper; clearly indicate when you have done this.

Do not write in the table to the right.

Do not use red pen.

Do not use pencil if you want the chance to regrade.

Question	Points	Score
1	3	
2	2	
3	2	
4	2	
5	2	
6	2	
7	3	
8	2	
9	2	
10	2	
11	3	
12	3	
13	20	
14	20	
15	20	
16	20	
17	30	
Total:	142	

1. (3 points) Define the variables within the normal distribution notation $X \sim N(\mu, \sigma^2)$.

2. (2 points) Define normal.

3. (2 points) Circle everything defined as average:
 - a. Mean
 - b. Median
 - c. Mode
 - d. Normal

4. (2 points) Define mean.

5. (2 points) Define median.

6. (2 points) Define mode.

7. (3 points) Calculate the mean, median, and mode of the set of numbers $\{1, 1, 2, 3, 5, 2023\}$.

8. (2 points) Is the mean normal?

9. (2 points) Is the median normal?

10. (2 points) Is the mode normal?

11. (3 points) Define regular polygon.

12. (3 points) Define the transitive law of equivalence.

13. (20 points) Is regular average?

14. (20 points) Is regular normal?

15. (20 points) Is normal regular?

16. (20 points) Is average regular?

17. (30 points) Given that:

$$p = \text{the average} \quad R = \text{the regular} \quad p \cap R \neq 0$$

Prove that $P(p \cup R)$ is normal.