Name:

Introduction to Statistics Summer Packet

Building a Strong Foundation for Success

Dear Student,

Welcome to the **Introduction to Statistics Summer Packet!** This packet is designed to help you strengthen your mathematical foundation and prepare for success in your upcoming statistics course.

Why is this important?

Statistics is a subject that requires both conceptual understanding and computational skills. By completing this packet, you will:

✅ **Review Essential Math Skills** – Reinforce key concepts that will help you analyze and interpret data effectively.
✅ **Develop a Strong Foundation** – Gain familiarity with statistical terms, calculations, and problem-solving techniques.
✅ **Improve Confidence** – Enter your statistics course feeling prepared and ready to succeed.
✅ **Enhance Critical Thinking** – Learn to interpret data, recognize patterns, and make informed decisions based on numerical information.

How to Approach This Packet

- Work through each section carefully and at a steady pace.
- Show all steps when solving problems to reinforce learning.
- Use scratch paper when necessary to organize your thoughts.
- If you find a topic challenging, take your time and seek help if needed.

Due Date & Expectations

This packet is expected to be **completed and submitted on the first day of class**. Your effort and accuracy will contribute to your readiness for the course.

We encourage you to take this opportunity seriously, as it will set the tone for your success in statistics. We look forward to an exciting and productive semester ahead!

📊 **The Mathematics Department**

Topics Covered

1. Prerequisite Topics (Basic Math Review)

- Order of Operations (PEMDAS)
- Fractions, Decimals, and Percentages
- Basic Algebraic Expressions
- Solving Linear Equations

2. Basics of Statistics

- Definition of Statistics
- Types of Data (Qualitative vs. Quantitative)
- Population vs. Sample
- Parameters vs. Statistics

3. Organizing & Displaying Data

- Frequency Tables
- Histograms
- Bar Graphs & Pie Charts
- Stem-and-Leaf Plots
- Box-and-Whisker Plots

4. Measures of Central Tendency

- Mean, Median, and Mode
- When to Use Each Measure
- Effects of Outliers on Measures of Center

5. Measures of Variation

- Range
- Interquartile Range (IQR)

6. Probability Basics

- Fundamental Probability Rules

Practice Problems

**Section 1: Prerequisite Math Review **

1. Simplify: $8 + (6 \div 2) \times 3$	2. Convert 0.45 to a percentage.
3. Convert 3/4 to a decimal.	4. Solve for x: $2x + 5 = 17$
5. Solve for x: $3(x - 4) = 15$	6. Find the value of: $(5/8) + (1/4)$
7. Convert 35% to a fraction in simplest form.	8. Solve for x: $5x - 7 = 3x + 9$

9. Convert 0.125 to a fraction.	10. If a shirt costs $20 and is on sale for 25% off, what is the sale price?
11. Evaluate: $4(2x + 3) = 32$	12. What is 20% of 150?
13. A jacket originally costs $80. If it is on sale for 30% off, what is the discounted price?	14. A meal costs $41. If you leave a 18% tip, how much is the total bill?
15. A school has 600 students. If 25% of them ride the bus, how many students take the bus?	16. A laptop is originally $1,200. If it is marked down by 15%, what is the sale price?

17. A store increases the price of a product by 10%. If the original price was $50, what is the new price?	18. If a student answered 40 out of 50 questions correctly on a test, what percentage did they score?
19. Convert 7% to a decimal.	20. Convert 0.85 to a percentage.
21. If an item costs $90 and is subject to an 8% tax, what is the final price including tax?	

**Section 2: Basics of Statistics **

22. Define statistics in your own words	23. Identify whether the following variable is categorical or quantitative: Heights of students in a class.
24. Classify the following data set as a population or a sample and explain why: The number of pets owned by each student in your class.	25. Identify whether the following variable is categorical or quantitative: The type of cuisine preferred by students in a cafeteria.
26. Classify the following data set as a population or a sample and explain why: The average test score of all students in a school.	27. Identify whether the following variable is categorical or quantitative: The number of books a person reads in a year.

28. Classify the following data set as a population or a sample and explain why: A poll asking 500 voters about their preferred candidate.	29. Identify whether the following variable is categorical or quantitative: The brand of smartphone owned by students in a class.
30. Classify the following data set as a population or a sample and explain why: The test scores of all students in a statistics class.	31. Identify whether the following variable is categorical or quantitative: The annual income of employees in a company.
32. Define the difference between a population and a sample.	33. Identify whether the following variable is categorical or quantitative: Favorite color of students.

**Section 3: Organizing & Displaying Data **

34. Create a frequency table for the following data set: 5, 8, 5, 10, 12, 5, 8, 10, 10, 12, 5.	35. Create a box-and-whisker plot for the following data: 4, 7, 9, 12, 15, 19, 22, 24, 27, 30.
36. Construct a histogram based on the frequency table you created.	37. Describe when to use a histogram versus a bar graph.
38. Describe when to use a histogram versus a bar graph.	39. Create a pie chart for the following categorical data: 30% prefer pizza, 25% prefer burgers, 20% prefer pasta, and 25% prefer sushi.
40. Construct a stem-and-leaf plot for: 23, 25, 27, 31, 34, 35, 36, 40, 45, 43.	41. Describe the advantages and disadvantages of using a box-and-whisker plot versus a histogram.

**Section 4: Measures of Central Tendency **

44. Find the mean, median, and mode of: 3, 7, 7, 10, 12, 15, 18.	45. Given the data set: [2, 4, 6, 8, 50], identify any outliers and describe their impact on the mean and median.
46. Compare mean vs. median for skewed data.	47. Explain why the median is sometimes a better measure of central tendency than the mean, using an example.
48. Identify if an outlier would significantly affect the mean.	49. Calculate the mean, median, and mode for the following data set and interpret the results: Data: [12, 15, 15, 18, 21, 21, 21, 24, 27]

**Section 5: Measures of Variation **

52. Find the range of the following data set: [5, 12, 18, 23, 29, 35, 42]	53. Calculate the IQR for the following data set: [10, 15, 22, 30, 35, 40, 45, 50, 55, 60]
54. Find the range of the following data set: [102, 98, 110, 105, 120, 99, 115]	55. Calculate the IQR for the following data set: [5, 9, 14, 18, 22, 27, 30, 34, 38, 42]

**Section 6: Probability Basics **

56. A bag contains 5 red, 3 blue, and 2 green marbles. What is the probability of randomly selecting a red marble?	57. A class has 12 boys and 18 girls. If a student is randomly selected, what is the probability that the student is a girl?
58. A number is randomly chosen from 1 to 10. What is the probability of selecting an even number?	59. A spinner is divided into 8 equal sections numbered 1-8. What is the probability of landing on a number greater than 5
60. A deck of cards is shuffled. What is the probability of drawing a heart?	