

Educational Worksheet

Grade 7 Mathematics Worksheet

Organizing and Presenting Data

Name: _____ **Date:** _____ **Class:** _____

Learning Objectives

By the end of this worksheet, you will be able to: - Analyze and interpret data from pie charts, waffle diagrams, scatter diagrams, and histograms - Determine the most appropriate method for presenting different types of data - Solve complex problems involving data organization and presentation - Apply critical thinking to evaluate data representation choices

Instructions

- Show all your working clearly
 - Read each question carefully and consider multiple approaches
 - For theoretical questions, provide clear explanations with reasoning
 - Use mathematical language appropriately
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Section A: Theoretical Understanding (20 marks)

1. **Data Representation Theory:** A research team collected data about students' favorite subjects across 500 students in a school. They found: Mathematics (125), Science (100), English (75), History (50), Art (75), PE (75).

b. Calculate the angle for each sector if represented in a pie chart. (4 marks)

Answer: _____

2. **Waffle Diagram Analysis:** A waffle diagram uses 100 squares to represent data. If 23 squares represent “Excellent”, 45 squares represent “Good”, 27 squares represent “Satisfactory”, and 5 squares represent “Needs Improvement”:

a. What percentage does each category represent? (2 marks)

b. Explain one advantage of using a waffle diagram over a pie chart for this data. (2 marks)

Answer: _____

Section B: Data Interpretation Puzzles (25 marks)

3. **Scatter Diagram Mystery:** A scatter diagram shows the relationship between hours of study (x-axis) and test scores (y-axis) for 20 students. The correlation appears positive but not perfect.

a. If one student studied for 6 hours and scored 85%, and another studied for 8 hours and scored 82%, what might explain this apparent contradiction to the general trend? (3 marks)

b. Design a question you could ask to gather additional data that might explain the scatter in the diagram. (2 marks)

Answer: _____

histogram bar for 155-159 cm is 1.5 times taller than the bar for 150-154 cm.

- a. Explain whether this histogram is correctly drawn. Show your reasoning. (4 marks)
- b. If the total number of students is 40, and the frequencies form a symmetric distribution, determine the possible frequencies for all intervals. (4 marks)

Answer: _____

Section C: Complex Problem Solving (30 marks)

5. **Multi-representation Challenge:** A survey asked 240 people about their preferred method of transportation. The results were: Car (96), Public Transport (72), Walking (48), Cycling (24).

- a. Create the calculations needed for both a pie chart and a waffle diagram representation. (4 marks)
- b. If you had to present this data to three different audiences: (i) city planners, (ii) environmental activists, (iii) school children, which representation would you choose for each and why? (6 marks)

Answer: _____

6. **Data Detective:** You're given four different representations of the same dataset but one contains an error:

- o Pie chart shows: $A=90^\circ$, $B=135^\circ$, $C=90^\circ$, $D=45^\circ$
- o Waffle diagram shows: $A=25\%$ $B=37.5\%$ $C=25\%$ $D=12.5\%$

- o Table shows: Total=80, A=25%, B=37.5%, C=25%, D=12.5%
- a. **Identify which representation contains the error and explain your reasoning. (4 marks)**
- b. **Correct the error and show your working. (2 marks)**

Answer: _____

Section D: Advanced Applications (25 marks)

7. **Scatter Diagram Construction:** You have collected data on the relationship between temperature ($^{\circ}\text{C}$) and ice cream sales (units per day): Temperature: 15, 18, 22, 25, 28, 30, 32, 35 Sales: 45, 52, 68, 75, 88, 95, 102, 115
- a. **Without drawing the scatter diagram, predict the type of correlation and explain your reasoning. (3 marks)**
 - b. **If the temperature was 26°C , estimate the ice cream sales and justify your method. (3 marks)**

Answer: _____

8. **Histogram Intervals Decision:** A researcher has collected 100 test scores ranging from 23% to 97%. They need to create a histogram but are unsure about interval width.
- a. **Compare the advantages and disadvantages of using 5% intervals versus 10% intervals. (4 marks)**

b. **If the data shows: 5 scores below 40% 15 scores 40-50% 35 scores 60-70% 30 scores**

marks)

Answer: _____

9. **Critical Analysis:** A company claims their new product has “dramatically improved customer satisfaction” and shows a pie chart where “Very Satisfied” takes up 40% of the chart.

- a. List three important pieces of information missing from this presentation that would help you evaluate their claim. (3 marks)

- b. Suggest how scatter diagrams or histograms might provide better evidence for their claim. (3 marks)

Answer: _____

10. **Data Transformation Challenge:** Convert this frequency table into the format needed for each representation:

Score Range	Frequency
0-19	3
20-39	7
40-59	15
60-79	20
80-100	5

- a. Calculate what you need for a pie chart representation. (3 marks)

- b. Explain why a waffle diagram might be challenging for this data and suggest a modification. (3 marks)

Answer: _____

Total: _____ / 100 marks

Self-Assessment

- I can choose appropriate data representations: ☐ Confident ☐ Mostly ☐ Need practice
- I can interpret complex data displays: ☐ Confident ☐ Mostly ☐ Need practice
- I can solve theoretical data problems: ☐ Confident ☐ Mostly ☐ Need practice
- I can critically evaluate data presentations: ☐ Confident ☐ Mostly ☐ Need practice

Key Methods to Remember

- **Pie Chart**: Best for parts of a whole, angles = $(\text{frequency}/\text{total}) \times 360^\circ$
- **Waffle Diagram**: Visual percentages using 100 squares for easy interpretation
- **Scatter Diagram**: Shows correlation between two continuous variables
- **Histogram**: Displays frequency distribution of continuous data with connected bars