
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).
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a. Explain why a pie chart would be more appropriate than a histogram for this data. (3 marks)

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: _____

4. **Histogram Frequency Puzzle:** A histogram shows the distribution of heights in a class. The frequency for the interval 150-154 cm is 8 students, and for 155-159 cm is 12 students. The 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:

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- Pie chart shows: $A=90^\circ$, $B=135^\circ$, $C=90^\circ$, $D=45^\circ$
 - Waffle diagram shows: $A=25\%$, $B=37.5\%$, $C=25\%$, $D=12.5\%$
 - Bar chart shows frequencies: $A=20$, $B=30$, $C=20$, $D=10$
 - 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 40-59%, 35 scores 60-79%, 30 scores 80-89%, 15 scores 90%+, recommend an interval system and justify your choice. (4 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

Score Range	Frequency
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