

Defend the Graph You Chose

GRADE 6

MATHEMATICS

D1.3

Choosing a graph is an argument you should be able to lose. A histogram's bin width and a line graph's starting point both change the story the data appears to tell, without changing a single number.

PART A: BINS AND TRENDS

1. Eight purchases are binned. The \$0 to \$9 bin holds 3 and the \$10 to \$19 bin holds 4, so the \$20 to \$29 bin holds _____.
2. Balances over four weeks were \$120, \$145, \$130 and \$160. The largest single rise was \$_____.
3. The overall change from week 1 to week 4 was \$_____.
4. The largest single fall was \$_____.

PART B: CHOOSE AND JUSTIFY

5. A class wants to show how spending split across four reward categories in one month. Which graph, and why?

SHOW YOUR WORK

Answer: _____

6. A class wants to see whether purchase prices cluster at the cheap end. Which graph, and why?

SHOW YOUR WORK

Answer: _____

7. Eight purchase prices are \$3, \$7, \$8, \$12, \$14, \$15, \$18 and \$22. Which \$10 bin holds the most, and what does that suggest?

SHOW YOUR WORK

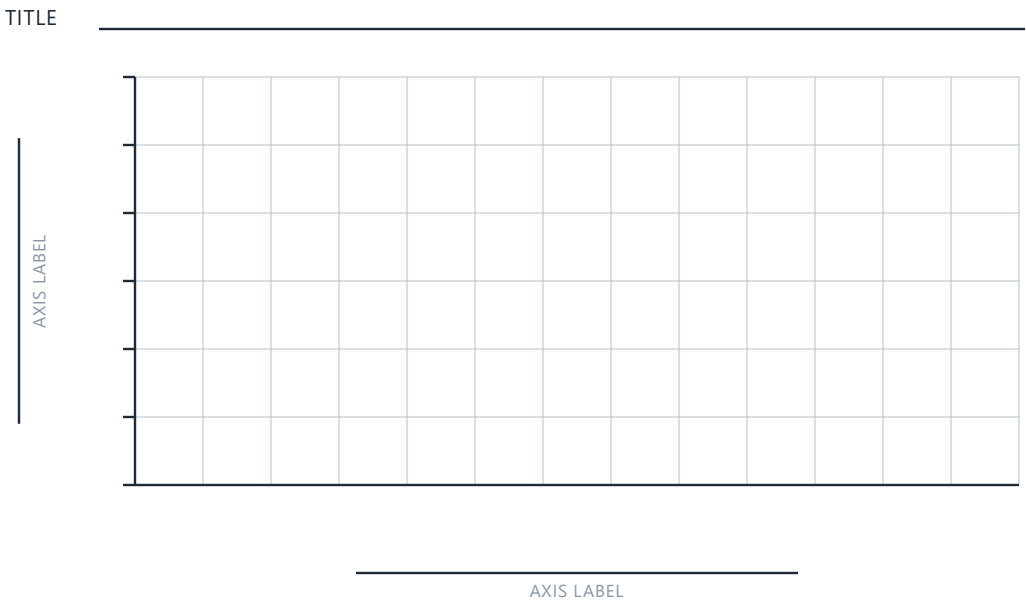
Answer: _____

PART C: HOW A GRAPH MISLEADS

8. A broken-line graph would mislead if:
- Ⓐ the categories have no order in time Ⓑ the numbers are large
 - Ⓒ there are more than five points
9. Changing a histogram's bin width can:
- Ⓐ change the shape the data appears to have Ⓑ change the total number of purchases
 - Ⓒ change the individual prices

PART D: DEFEND A BIN WIDTH

10. Take the eight purchase prices from Part B. Choose a bin width and draw the histogram, with a title, both axes labelled, a scale that counts up in a sensible step, and a line naming the source.



WHERE THE NUMBERS CAME FROM _____

11. Explain what a different bin width would have hidden or revealed.

12. With \$10 bins, how many of the eight purchases cost less than \$20, and what fraction of all eight is that?

SHOW YOUR WORK

Answer: _____

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ANSWER KEY

1. 1
2. 30
3. 40
4. 15
5. A circle graph, because the four categories are parts of one month's total spending and the graph shows each share of that whole.
6. A histogram, because it groups the prices into bands and shows how many purchases land in each one.
7. The \$10 to \$19 bin holds 4, more than any other bin, which suggests most purchases sit in the middle of the range rather than at either end.
8. A) the categories have no order in time
9. A) change the shape the data appears to have
10. The drawn histogram needs a title such as "Purchase Prices This Month", price bands along the bottom, the number of purchases up the side counting in ones, and a source line. With \$10 bins the bars are 3, 4 and 1; with \$5 bins they are 1, 2, 2, 2 and 1.
11. With \$10 bins the shape is 3, 4, 1, which shows most purchases in the middle band. With \$5 bins it becomes 1, 2, 2, 2, 1, which carries more detail but flattens the middle cluster that the wider bins made obvious. Either choice is defensible if the explanation says what it reveals and what it costs.
12. 7 purchases, because the first two bins hold $3 + 4 = 7$, which is 7 of the 8 purchases.

TEACHER NOTES

Extension beyond the grade-level expectation: Part A asks for the largest single rise and fall rather than the overall change, which requires comparing every step, and Part D makes bin width the subject rather than a setting. The two multiple-choice items are about how a correct graph can still mislead.