Displaying Data with Histograms

Name: _____	Date: _____	Score: _____ / 24

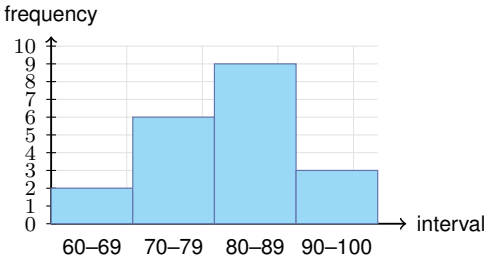
Quick Review

A **histogram** displays numerical data grouped into equal-width intervals. The bars touch because the intervals cover a continuous number scale. The height of each bar is the frequency in that interval. Use histograms to describe shape: clusters, peaks, gaps, spread, and skew. Always check the interval labels and the vertical scale before answering a question from a histogram.

PRACTICE

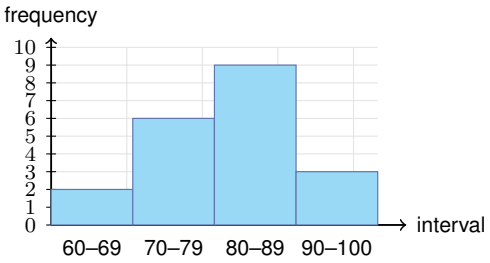
Use the tables and histograms to answer each question.

1. The histogram shows quiz scores. How many students are represented in all?



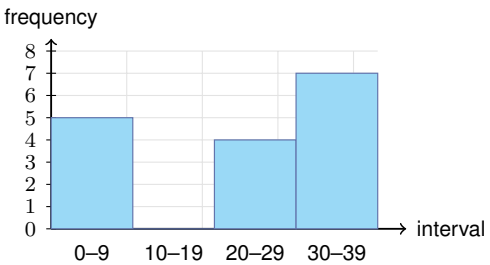
Answer: _____

2. Using the histogram, which score interval has the greatest frequency?



Answer: _____

3. Which interval is a gap in the histogram?



Answer: _____

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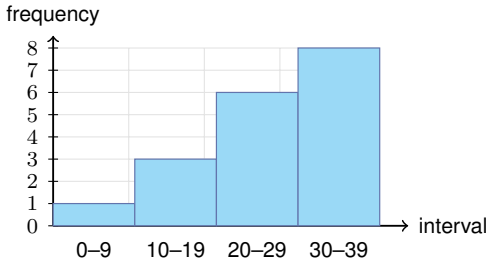
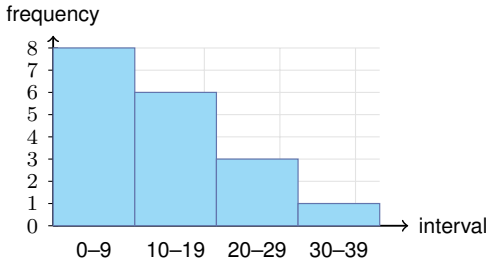
4. Describe the shape of the distribution.



Answer: _____

5. Describe the shape of the distribution.



Answer: _____

6. Complete the frequency row for the data $10, 12, 13, 14, 15, 17, 18, 21, 22, 26, 27, 29$.

Interval	10–14	15–19	20–24	25–29
Frequency				

Answer: _____

7. Data run from 3 to 47. Using width 10 starting at 0, list the intervals.

Answer: _____

8. Find the relative frequency for the 20–29 interval.

Interval	0–9	10–19	20–29	Total
Frequency	5	7	8	20

Answer: _____

9. Which interval contains the median?

Interval	0–9	10–19	20–29	30–39
Frequency	2	5	10	3

Answer: _____

10. Should favorite colors be displayed with a histogram?

Answer: _____

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11. Should student heights be displayed with a histogram?

Answer: _____

12. Complete the frequency row for scores $61, 67, 81, 83, 87, 88, 89, 90, 98, 100$.

Interval	60–69	70–79	80–89	90–100
Frequency				

Answer: _____

13. Which class has more scores in the 80–89 interval?

Class	60–69	70–79	80–89	90–99
A	2	5	8	4
B	1	4	6	7

Answer: _____

14. What does it mean if two histogram bars touch?

Answer: _____

15. Find the total in the first two intervals.

Interval	0–4	5–9	10–14	15–19
Frequency	6	4	3	2

Answer: _____

16. Which interval is the mode interval?

Interval	0–9	10–19	20–29	30–39
Frequency	4	4	9	1

Answer: _____

17. Which histogram would show more detail: width 5 bins or width 20 bins?

Answer: _____

18. Which histogram would be easier to summarize quickly: width 5 bins or width 20 bins?

Answer: _____

19. A histogram has bar heights $1, 3, 3, 1$. Describe the shape.

Answer: _____

20. A histogram has two separated peaks. What word describes this?

Answer: _____

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Word Problems

21. A teacher groups quiz times into intervals with frequencies $3, 7, 6, 4$. How many students are represented?

Answer: _____

22. A reading histogram has its tallest bar at 40–59 pages. What does that interval tell you?

Answer: _____

23. A histogram of commute times has most bars on the low end and a long tail to the right. Describe the skew.

Answer: _____

24. A data set has no values from 30–39 minutes, but values appear before and after that interval. What should the histogram show?

Answer: _____

Answer Keys

1. 20
2. 80–89
3. 10–19
4. left-skewed
5. right-skewed
6. $4, 3, 2, 3$
7. $0–9,\ 10–19,\ 20–29,\ 30–39,\ 40–49$
8. 0.40 or 40%
9. 20–29
10. no
11. yes
12. $2, 0, 5, 3$
13. Class A
14. the intervals are adjacent on a number scale
15. 10
16. 20–29
17. width 5
18. width 20
19. roughly symmetric
20. bimodal
21. 20
22. it is the most common page range
23. right-skewed
24. a gap at 30–39

Step-by-Step Tutor Notes

1. Keep the order of operations in view, then simplify without skipping the sign check. Add the bar heights: $2 + 6 + 9 + 3 = 20$ students. After simplifying, the answer is 20.
2. Read the table by matching the correct row and column first, then use the count or total that fits the question. The tallest bar is the $80–89$ interval, with frequency 9. This gives $80–89$.
3. Read the table by matching the correct row and column first, then use the count or total that fits the question. A gap has frequency 0. The $10–19$ interval has no bar. This gives $10–19$.
4. Start with the definition the problem is testing, then apply it directly. Most values are in the higher intervals, with a tail toward the lower intervals. So the answer is left-skewed.
5. Start with the definition the problem is testing, then apply it directly. Most values are in the lower intervals, with a tail toward the higher intervals. So the answer is right-skewed.
6. This is a good place to slow down, check the notation, and simplify cleanly. Count the values in each interval: $4, 3, 2, 3$. So the answer is $4, 3, 2, 3$.
7. Take it one clear step at a time and keep the original question in mind. Start at 0 and keep equal widths of 10 until the maximum is included. So the answer is $0–9,\ 10–19,\ 20–29,\ 30–39,\ 40–49$.
8. For a table question, slow down and locate the exact row, column, or cell before calculating. Relative frequency is $8/20 = 0.40$. This gives 0.40 or 40%.
9. There are 20 values, so the middle is around the 10th and 11th values; both fall in $20–29$.
10. Start with the definition the problem is testing, then apply it directly. Favorite color is categorical, so a bar graph is better than a histogram. So the answer is no.
11. Start with the definition the problem is testing, then apply it directly. Heights are numerical measurements that can be grouped into intervals. So the answer is yes.
12. Count carefully: two in the 60s, none in the 70s, five in the 80s, and three from 90 to 100.
13. This is a good place to slow down, check the notation, and simplify cleanly. Class A has 8 values in that interval; Class B has 6. So the answer is Class A.
14. This is a good place to slow down, check the notation, and simplify cleanly. Histogram bars touch because the data intervals are continuous. So the answer is the intervals are adjacent on a number scale.
15. Work one inverse operation at a time and keep both sides balanced. Add the first two frequencies: $6 + 4 = 10$. After simplifying, the answer is 10.
16. For a table question, slow down and locate the exact row, column, or cell before calculating. The mode interval has the tallest bar, frequency 9. This gives $20–29$.
17. Focus on the main idea of the problem, then simplify carefully. Smaller bins usually show more detail, though too many bins can look noisy. So the answer is width 5.
18. Focus on the main idea of the problem, then simplify carefully. Wider bins give a simpler big-picture view. So the answer is width 20.
19. Use the clue in the question first, then let the arithmetic finish the job. The heights rise and fall in a balanced way. So the answer is roughly symmetric.
20. Start with the definition the problem is testing, then apply it directly. Two clear peaks means the distribution is bimodal. So the answer is bimodal.
21. Read the table by matching the correct row and column first, then use the count or total that fits the question. Add every interval frequency: $3 + 7 + 6 + 4 = 20$ students. This gives 20.
22. The tallest bar is the interval with the greatest frequency, so more students read $40–59$ pages than any other listed range.
23. A long tail toward larger values is right skew, even if most data are on the left.
24. Set up the model from the story, then calculate carefully. An interval with no data gets a bar height of 0, creating a visible gap.

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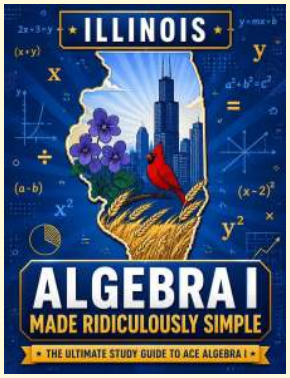

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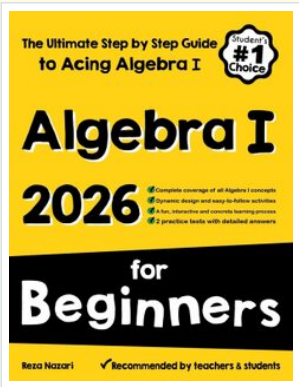

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