Data Displays Extended

Choosing and checking data displays: Mistakes and missing information

Name _____ **Date** _____ **Score** _____ / 6

QUICK REVIEW

Choose a display for the data and question. Dot/stem plots preserve individual values; histograms group intervals; box plots show a five-number summary; circle graphs compare categories within one whole. For $2, 2, 4, 6$, a dot plot retains all four values, a box plot has median $(2 + 4)/2 = 3$, and a frequency total must still be 4.

Worked example

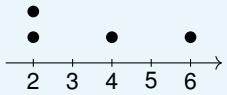
Preserve each exact observation. Data: $2, 2, 4, 6$. Draw one dot per observation, then give every nonzero frequency.

1. Tally each value separately: $2 : 2, 4 : 1, 6 : 1$.

2. Total dots $= 2 + 1 + 1 = 4$; repeated values each contribute a dot.

3. Range $= 6 - 2 = 4$.

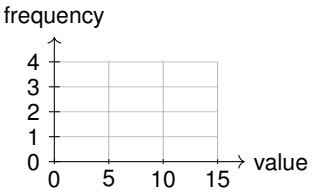
Answer: Value:frequency $2 : 2, 4 : 1, 6 : 1$; total 4; range 4.



Practice Problems

Show your thinking.

1. A student places boundary 5 in both intervals. Construct a corrected grouped display. Intervals are $0 \le x < 5$, $5 \le x < 10$, $10 \le x < 15$. Data: $0, 4, 5, 5, 9, 10, 14$. Draw touching bars and give their heights.

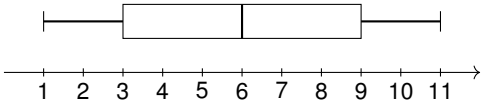


2. Recover exact observations, which a histogram would not preserve. Read the plot, rewrite the values in order, and find count, median, and range.

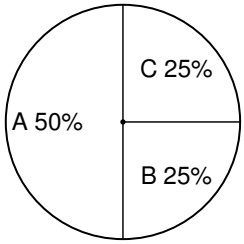
Stem	Leaves
2	0 2 2 5
3	1 4

Key: $2 \mid 3 = 23$.

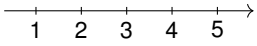
3. A student calls the median line the mean. Recover the marked median and quartiles. Read the five-number summary, IQR, and range from the box plot.



4. Recover category counts from one complete whole. There are 80 observations. Use the labeled graph to find each category count and sector angle.



5. Design a replacement for a plot that dropped repeats. Data: $1, 1, 3, 3, 3, 5$. Draw one dot per observation, then give every nonzero frequency.



6. Can a histogram with counts $3, 4, 2$ and a dot plot with 8 dots show exactly the same observations?

Answer Key

1. Bar heights $2, 3, 2$; total 7.

2.

Stem	Leaves
2	0 2 2 5
3	1 4

Key: $2 \mid 3 = 23$.

Count 6; median $\frac{47}{2}$; range 14.

3. Min 1, $Q_1 = 3$, median 6, $Q_3 = 9$, max 11; IQR 6; range 10.

4. Counts A: 40, B: 20, C: 20. Angles A: $180°$, B: $90°$, C: $90°$.

5. Value:frequency $1 : 2$, $3 : 3$, $5 : 1$; total 6; range 4.

6. No; their counts differ by 1.

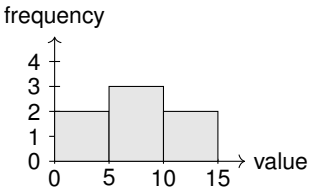
Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Count data in each interval: $0 \le x < 5 : 2$; $5 \le x < 10 : 3$; $10 \le x < 15 : 2$.

2. Total frequency $= 2 + 3 + 2 = 7$. Boundary values enter the interval beginning at that value, not the preceding one.



Problem 2

1. Use tens as stems and ones as leaves: $20 = 10 \times 2 + 0$; $34 = 10 \times 3 + 4$.

2. Stem frequencies are $2 : 4$, $3 : 2$; total leaves 6.

3. Sorted values: $20, 22, 22, 25, 31, 34$. Average the values in positions 3 and 4: $(22 + 25)/2 = \frac{47}{2}$ for the median. Range $= 34 - 20 = 14$.

Problem 3

1. The whisker tips mark minimum 1 and maximum 11. Read the median line at 6.

2. The left box edge is $Q_1 = 3$; the right edge is $Q_3 = 9$.

3. IQR $= 9 - 3 = 6$. Full range $= 11 - 1 = 10$.

Problem 4

1. The percentages total $50\% + 25\% + 25\% = 100\%$.

2. Counts: $80 \times 50/100 = 40$; $80 \times 25/100 = 20$; $80 \times 25/100 = 20$.

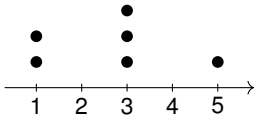
3. Sector angles: $360 \times 50/100 = 180°$; $360 \times 25/100 = 90°$; $360 \times 25/100 = 90°$. Counts total 80; angles total $360°$.

Problem 5

1. Tally each value separately: $1 : 2$, $3 : 3$, $5 : 1$.

2. Total dots $= 2 + 3 + 1 = 6$; repeated values each contribute a dot.

3. Range $= 5 - 1 = 4$.



Problem 6

1. Histogram frequency total $= 3 + 4 + 2 = 9$.

2. The dot plot has 8 observations; $9 - 8 = 1$, so the displays cannot match exactly.

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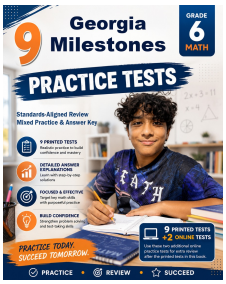

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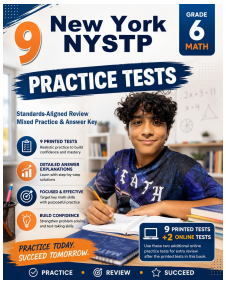

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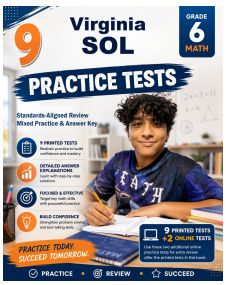

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