Data Displays Extended

Choosing and checking data displays: Applications and decisions

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

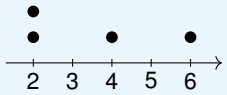
Preserve each exact observation. Data: $2, 2, 4, 6$. Draw one dot per observation, then give every nonzero frequency.

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 $= 6 - 2 = 4$.

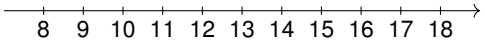
Answer: Value:frequency $2 : 2, 4 : 1, 6 : 1$; total 4; range 4.



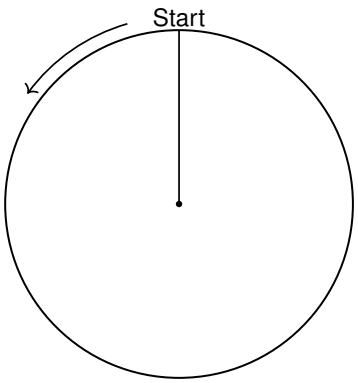
Practice Problems

Show your thinking.

1. A planner wants the median and middle-half spread of wait times, not exact individual observations. Design the display. Data: $8, 10, 12, 14, 16, 18$. Draw the box plot and state the five-number summary, IQR, and range.



2. A survey has three favorite-activity categories. Build a parts-of-whole display. There are 100 observations. Use A: 20%, B: 30%, C: 50%. Draw and label the circle graph from the top ray, counterclockwise. Find counts and angles.

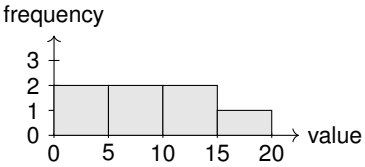


3. A lab must retain exact measured lengths. Build its display. Data: $11, 14, 17, 20, 23, 26$. Construct the plot, then find count, median, and range.

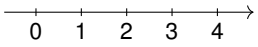
Stem	Leaves
1	
2	

Key: $2 \mid 3 = 23$.

4. A transit office groups ride times into intervals. Read its display. Intervals are $0 \le x < 5$, $5 \le x < 10$, $10 \le x < 15$, $15 \le x < 20$. Read every bar height and the total number of observations.



5. A report loses a duplicate pet count. Reconstruct the full display. Data: $0, 1, 1, 2, 4, 4, 4$. Draw one dot per observation, then give every nonzero frequency.



6. A survey of 40 students reports category counts $12, 18, 10$. Could the corresponding percentages be $30\%, 45\%, 25\%$? Check all three and the total.

Answer Key

1. Min 8, $Q_1 = 10$, median 13, $Q_3 = 16$, max 18; IQR 6; range 10.

2. Counts A: 20, B: 30, C: 50. Angles A: $72°$, B: $108°$, C: $180°$.

3.

Stem	Leaves
1	1 4 7
2	0 3 6

Key: $2 \mid 3 = 23$.

Count 6; median $\frac{37}{2}$; range 15.

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

5. Value:frequency $0 : 1$, $1 : 2$, $2 : 1$, $4 : 3$; total 7; range 4.

6. Yes; the counts and percentages agree.

Step-by-Step Solutions

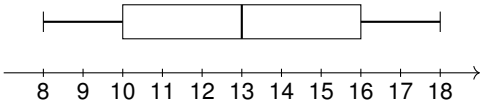
Follow each calculation, then check your own work.

Problem 1

1. Sort: $8, 10, 12, 14, 16, 18$. Average positions 3 and 4: $(12 + 14)/2 = 13$.

2. Lower half $8, 10, 12$ gives $Q_1 = 10$; upper half $14, 16, 18$ gives $Q_3 = 16$.

3. The whiskers end at $8, 18$; box width $= 16 - 10 = 6$ and full range $= 18 - 8 = 10$.



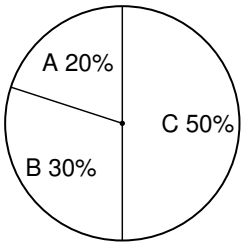
Problem 2

1. The percentages total $20\% + 30\% + 50\% = 100\%$.

2. Counts: $100 \times 20/100 = 20$; $100 \times 30/100 = 30$; $100 \times 50/100 = 50$.

3. Sector angles: $360 \times 20/100 = 72°$; $360 \times 30/100 = 108°$; $360 \times 50/100 = 180°$. Counts total 100; angles total $360°$.

4. Start at the top radius. From the center, measure each next angle counterclockwise from the last boundary. Label each wedge; the last one returns to the top.



Problem 3

1. Use tens as stems and ones as leaves: $11 = 10 \times 1 + 1$; $26 = 10 \times 2 + 6$.

2. Stem frequencies are $1 : 3$, $2 : 3$; total leaves 6.

3. Sorted values: $11, 14, 17, 20, 23, 26$. Average the values in positions 3 and 4: $(17 + 20)/2 = \frac{37}{2}$ for the median. Range $= 26 - 11 = 15$.

Problem 4

1. Read each bar: $0 \le x < 5 : 2$; $5 \le x < 10 : 2$; $10 \le x < 15 : 2$; $15 \le x < 20 : 1$.

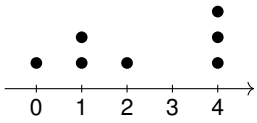
2. Total frequency $= 2 + 2 + 2 + 1 = 7$. Boundary values enter the interval beginning at that value, not the preceding one.

Problem 5

1. Tally each value separately: $0 : 1$, $1 : 2$, $2 : 1$, $4 : 3$.

2. Total dots $= 1 + 2 + 1 + 3 = 7$; repeated values each contribute a dot.

3. Range $= 4 - 0 = 4$.



Problem 6

1. $12/40 = 30\%$, $18/40 = 45\%$, and $10/40 = 25\%$.

2. Counts total $12 + 18 + 10 = 40$ and percentages total $30\% + 45\% + 25\% = 100\%$.

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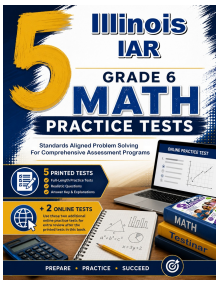

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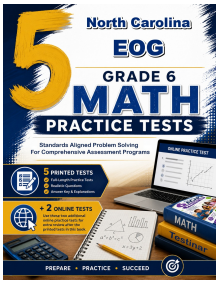

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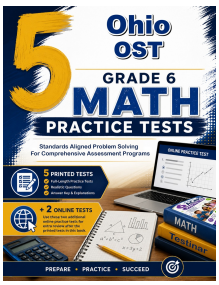

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