Stem-and-Leaf Plots

Stem-and-leaf plots: Mistakes and missing information

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QUICK REVIEW

A stem-and-leaf plot keeps every exact value. With key $2 \mid 3 = 23$, $21, 23, 23, 35$ become stem 2 with leaves $1, 3, 3$ and stem 3 with leaf 5. Sort leaves and retain repeats. The four observations have median $(23 + 23)/2 = 23$ and range $35 - 21 = 14$.

Worked example

Organize the observations. Data: $21, 23, 23, 35$. Construct the plot, then find count, median, and range.

Stem	Leaves
2	
3	

Key: $2 \mid 3 = 23$.

1. Use tens as stems and ones as leaves: $21 = 10 \times 2 + 1$; $35 = 10 \times 3 + 5$.

2. Stem frequencies are $2 : 3$, $3 : 1$; total leaves 4.

3. Sorted data $21, 23, 23, 35$ give median 23 and range $35 - 21 = 14$.

Answer:

Stem	Leaves
2	1 3 3
3	5

Key: $2 \mid 3 = 23$.

Count 4; median 23; range 14.

Practice Problems

Show your thinking.

1. A student keeps only one copy of leaf 3 on stem 1. Repair it. Data: $13, 13, 17, 20, 24, 28$. Construct the plot, then find count, median, and range.

Stem	Leaves
1	
2	

Key: $2 \mid 3 = 23$.

2. Recover the original numerical list from the stems. Read the plot, rewrite the values in order, and find count, median, and range.

Stem	Leaves
2	2 5 8
3	1 4 7

Key: $2 \mid 3 = 23$.

3. A student reads $1 \mid 0$ as 1. Correct the values and summaries. Read the plot, rewrite the values in order, and find count, median, and range.

Stem	Leaves
1	0 2 5
2	1 3 6

Key: $2 \mid 3 = 23$.

4. Recover the counts from all leaves, including the duplicate. Read the plot, rewrite the values in order, and find count, median, and range.

Stem	Leaves
1	6 8
2	4 4
3	0 3

Key: $2 \mid 3 = 23$.

5. A student leaves stems and leaves unsorted. Construct an ordered plot. Data: $11, 19, 22, 25, 27, 32$. Construct the plot, then find count, median, and range.

Stem	Leaves
1	
2	
3	

Key: $2 \mid 3 = 23$.

6. Explain why the number of stems is not the number of observations. Read the plot, rewrite the values in order, and find count, median, and range.

Stem	Leaves
1	4 7
2	0 3 6

Key: $2 \mid 3 = 23$.

Answer Key

1.

Stem	Leaves
1	3 3 7
2	0 4 8

Key: $2 \mid 3 = 23$.
Count 6; median $\frac{37}{2}$; range 15.

2.

Stem	Leaves
2	2 5 8
3	1 4 7

Key: $2 \mid 3 = 23$.
Count 6; median $\frac{59}{2}$; range 15.

3.

Stem	Leaves
1	0 2 5
2	1 3 6

Key: $2 \mid 3 = 23$.
Count 6; median 18; range 16.

4.

Stem	Leaves
1	6 8
2	4 4
3	0 3

Key: $2 \mid 3 = 23$.
Count 6; median 24; range 17.

5.

Stem	Leaves
1	1 9
2	2 5 7
3	2

Key: $2 \mid 3 = 23$.
Count 6; median $\frac{47}{2}$; range 21.

6.

Stem	Leaves
1	4 7
2	0 3 6

Key: $2 \mid 3 = 23$.
Count 5; median 20; range 12.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Use tens as stems and ones as leaves: $13 = 10 \times 1 + 3$; $28 = 10 \times 2 + 8$.

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

3. Sorted data $13, 13, 17, 20, 24, 28$ give median $\frac{37}{2}$ and range $28 - 13 = 15$.

Problem 2

1. Use tens as stems and ones as leaves: $22 = 10 \times 2 + 2$; $37 = 10 \times 3 + 7$.

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

3. Sorted data $22, 25, 28, 31, 34, 37$ give median $\frac{59}{2}$ and range $37 - 22 = 15$.

Problem 3

1. Use tens as stems and ones as leaves: $10 = 10 \times 1 + 0$; $26 = 10 \times 2 + 6$.

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

3. Sorted data $10, 12, 15, 21, 23, 26$ give median 18 and range $26 - 10 = 16$.

Problem 4

1. Use tens as stems and ones as leaves: $16 = 10 \times 1 + 6$; $33 = 10 \times 3 + 3$.

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

3. Sorted data $16, 18, 24, 24, 30, 33$ give median 24 and range $33 - 16 = 17$.

Problem 5

1. Use tens as stems and ones as leaves: $11 = 10 \times 1 + 1$; $32 = 10 \times 3 + 2$.

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

3. Sorted data $11, 19, 22, 25, 27, 32$ give median $\frac{47}{2}$ and range $32 - 11 = 21$.

Problem 6

1. Use tens as stems and ones as leaves: $14 = 10 \times 1 + 4$; $26 = 10 \times 2 + 6$.

2. Stem frequencies are $1 : 2$, $2 : 3$; total leaves 5.

3. Sorted data $14, 17, 20, 23, 26$ give median 20 and range $26 - 14 = 12$.

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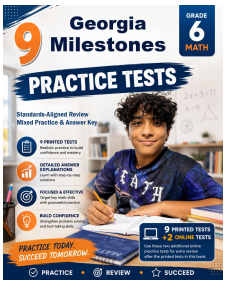

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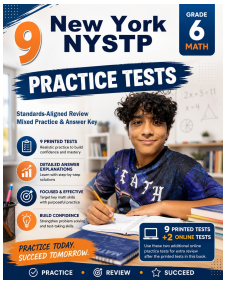

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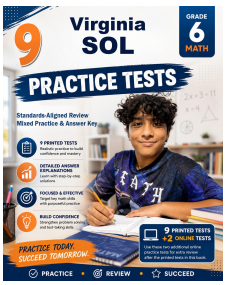

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