Stem-and-Leaf Plots

Stem-and-leaf plots: Models and calculations

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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. Build an ordered stem plot. Data: $12, 15, 15, 18, 21, 24$. Construct the plot, then find count, median, and range.

Stem	Leaves
1	
2	

Key: $2 \mid 3 = 23$.

2. Read every leaf as a separate value. Read the plot, rewrite the values in order, and find count, median, and range.

Stem	Leaves
2	3 4 7
3	1 3 8

Key: $2 \mid 3 = 23$.

3. Include a zero leaf and repeated leaves. Data: $10, 14, 22, 22, 29, 31$. Construct the plot, then find count, median, and range.

Stem	Leaves
1	
2	
3	

Key: $2 \mid 3 = 23$.

4. Find summaries for reading minutes. Read the plot, rewrite the values in order, and find count, median, and range.

Stem	Leaves
1	8
2	1 3 5
3	2

Key: $2 \mid 3 = 23$.

5. Explain the meaning of the tens-and-ones key. Read the plot, rewrite the values in order, and find count, median, and range.

Stem	Leaves
1	1 2 6
2	4 5 9

Key: $2 \mid 3 = 23$.

6. A student removes repeated leaves. Construct the repaired display. Data: $20, 22, 22, 27, 34, 35$. Construct the plot, then find count, median, and range.

Stem	Leaves
2	
3	

Key: $2 \mid 3 = 23$.

Answer Key

1.

Stem	Leaves
1	2 5 5 8
2	1 4

Key: $2 \mid 3 = 23$.

Count 6; median $\frac{33}{2}$; range 12.

2.

Stem	Leaves
2	3 4 7
3	1 3 8

Key: $2 \mid 3 = 23$.

Count 6; median 29; range 15.

3.

Stem	Leaves
1	0 4
2	2 2 9
3	1

Key: $2 \mid 3 = 23$.

Count 6; median 22; range 21.

4.

Stem	Leaves
1	8
2	1 3 5
3	2

Key: $2 \mid 3 = 23$.

Count 5; median 23; range 14.

5.

Stem	Leaves
1	1 2 6
2	4 5 9

Key: $2 \mid 3 = 23$.

Count 6; median 20; range 18.

6.

Stem	Leaves
2	0 2 2 7
3	4 5

Key: $2 \mid 3 = 23$.

Count 6; median $\frac{49}{2}$; range 15.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Use tens as stems and ones as leaves: $12 = 10 \times 1 + 2$; $24 = 10 \times 2 + 4$.

2. Stem frequencies are $1 : 4$, $2 : 2$; total leaves 6.

3. Sorted data $12, 15, 15, 18, 21, 24$ give median $\frac{33}{2}$ and range $24 - 12 = 12$.

Problem 2

1. Use tens as stems and ones as leaves: $23 = 10 \times 2 + 3$; $38 = 10 \times 3 + 8$.

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

3. Sorted data $23, 24, 27, 31, 33, 38$ give median 29 and range $38 - 23 = 15$.

Problem 3

1. Use tens as stems and ones as leaves: $10 = 10 \times 1 + 0$; $31 = 10 \times 3 + 1$.

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

3. Sorted data $10, 14, 22, 22, 29, 31$ give median 22 and range $31 - 10 = 21$.

Problem 4

1. Use tens as stems and ones as leaves: $18 = 10 \times 1 + 8$; $32 = 10 \times 3 + 2$.

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

3. Sorted data $18, 21, 23, 25, 32$ give median 23 and range $32 - 18 = 14$.

Problem 5

1. Use tens as stems and ones as leaves: $11 = 10 \times 1 + 1$; $29 = 10 \times 2 + 9$.

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

3. Sorted data $11, 12, 16, 24, 25, 29$ give median 20 and range $29 - 11 = 18$.

Problem 6

1. Use tens as stems and ones as leaves: $20 = 10 \times 2 + 0$; $35 = 10 \times 3 + 5$.

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

3. Sorted data $20, 22, 22, 27, 34, 35$ give median $\frac{49}{2}$ and range $35 - 20 = 15$.

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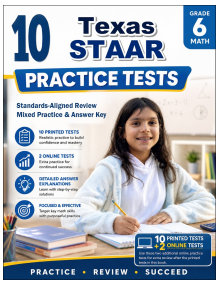

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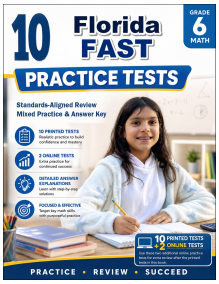

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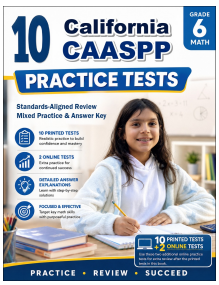

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