Solving Problems Using Line Plots

Solving Problems Using Line Plots: Apply, Compare, and Design

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

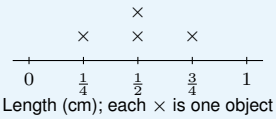
QUICK REVIEW

Each mark represents one measured object. To find combined length, multiply each tick value by its frequency, then add. Two objects of $\frac{1}{2}$ cm and three of $\frac{3}{4}$ cm have total $2 \times \frac{1}{2} + 3 \times \frac{3}{4} = \frac{13}{4}$ cm, not merely 5 cm.

Worked example

Find the combined length of all the objects in the line plot.

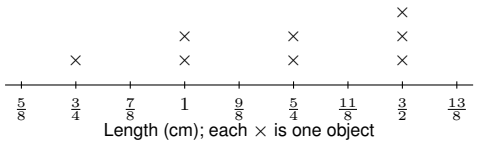
1. Count marks at each occupied tick: $\frac{1}{4}$: 1, $\frac{1}{2}$: 2, $\frac{3}{4}$: 1.
2. Object count: $1 + 2 + 1 = 4$.
3. Add measured lengths, not just marks: $1 \times \frac{1}{4} + 2 \times \frac{1}{2} + 1 \times \frac{3}{4} = 2$ cm.
Answer: 2 cm.



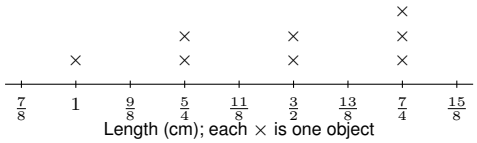
Practice Problems

Show your thinking.

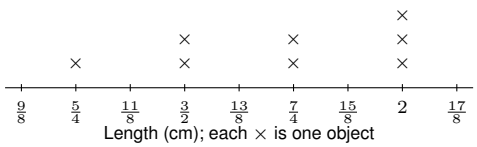
1. One new object of length $\frac{3}{2}$ cm is added. Draw its extra mark on the given plot and find the new total length.



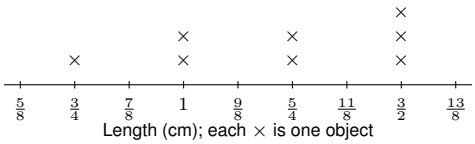
2. All object lengths are joined, then cut into 8 equal pieces. Find one new piece's length.



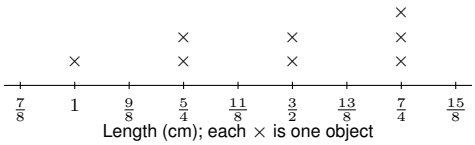
3. Find the combined length of all 2 cm objects and all $\frac{5}{4}$ cm objects. How much greater is the first combined length?



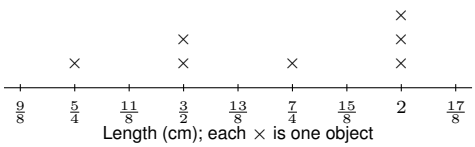
4. One object of length $\frac{3}{2}$ cm is removed. Find the total length and object count that remain.



5. Find the combined length of all the objects in the line plot.



6. One mark is missing from this plot. Use the length data in cm, $\frac{5}{4}, \frac{3}{2}, \frac{3}{2}, \frac{7}{4}, \frac{7}{4}, 2, 2, 2$, to find and add the missing mark. Then find the corrected total length.



Answer Key

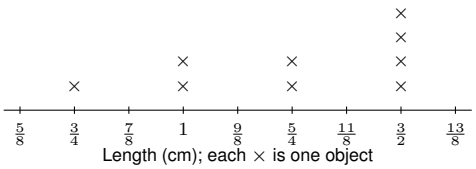
1. One extra mark at $\frac{3}{2}$ cm; total $\frac{45}{4}$ cm.
2. $\frac{47}{32}$ cm each.
3. 6 cm and $\frac{5}{4}$ cm; difference $\frac{19}{4}$ cm.
4. $\frac{33}{4}$ cm; 7 objects.
5. $\frac{47}{4}$ cm.
6. Add one mark at $\frac{7}{4}$ cm; total $\frac{55}{4}$ cm.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Count marks at each occupied tick: $\frac{3}{4}$: 1, 1: 2, $\frac{5}{4}$: 2, $\frac{3}{2}$: 3.
2. Object count: $1+2+2+3=8$.
3. Add measured lengths, not just marks:
$1\times\frac{3}{4}+2\times1+2\times\frac{5}{4}+3\times\frac{3}{2}=\frac{39}{4}$ cm.
4. New total: $\frac{39}{4}+\frac{3}{2}=\frac{45}{4}$ cm.



Length (cm); each × is one object

Problem 2

1. Count marks at each occupied tick: 1: 1, $\frac{5}{4}$: 2, $\frac{3}{2}$: 2, $\frac{7}{4}$: 3.
2. Object count: $1+2+2+3=8$.
3. Add measured lengths, not just marks:
$1\times1+2\times\frac{5}{4}+2\times\frac{3}{2}+3\times\frac{7}{4}=\frac{47}{4}$ cm.
4. Equal length: $\frac{47}{4}\div8=\frac{47}{32}$ cm; check $8\times\frac{47}{32}=\frac{47}{4}$.

Problem 3

1. Count marks at each occupied tick: $\frac{5}{4}$: 1, $\frac{3}{2}$: 2, $\frac{7}{4}$: 2, 2: 3.
2. Object count: $1+2+2+3=8$.
3. Longest group: $3\times2=6$ cm; shortest group: $1\times\frac{5}{4}=\frac{5}{4}$ cm.
4. First minus second: $6-\frac{5}{4}=\frac{19}{4}$ cm.

Problem 4

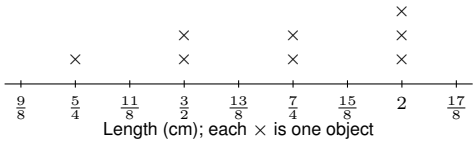
1. Count marks at each occupied tick: $\frac{3}{4}$: 1, 1: 2, $\frac{5}{4}$: 2, $\frac{3}{2}$: 3.
2. Object count: $1+2+2+3=8$.
3. Add measured lengths, not just marks:
$1\times\frac{3}{4}+2\times1+2\times\frac{5}{4}+3\times\frac{3}{2}=\frac{39}{4}$ cm.
4. Length left: $\frac{39}{4}-\frac{3}{2}=\frac{33}{4}$ cm; count $8-1=7$.

Problem 5

1. Count marks at each occupied tick: 1: 1, $\frac{5}{4}$: 2, $\frac{3}{2}$: 2, $\frac{7}{4}$: 3.
2. Object count: $1+2+2+3=8$.
3. Add measured lengths, not just marks:
$1\times1+2\times\frac{5}{4}+2\times\frac{3}{2}+3\times\frac{7}{4}=\frac{47}{4}$ cm.

Problem 6

1. The data list 2 lengths of $\frac{7}{4}$ cm, but the given plot has 1. Add one mark there.
2. Count marks at each occupied tick: $\frac{5}{4}$: 1, $\frac{3}{2}$: 2, $\frac{7}{4}$: 2, 2: 3.
3. Object count: $1+2+2+3=8$.
4. Add measured lengths, not just marks:
$1\times\frac{5}{4}+2\times\frac{3}{2}+2\times\frac{7}{4}+3\times2=\frac{55}{4}$ cm.



Length (cm); each × is one object

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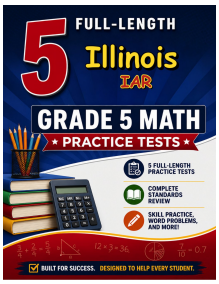

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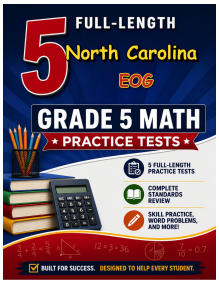

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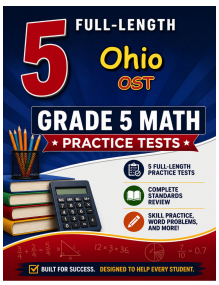

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