Comparing Two Populations Visually

Spot mistakes, reason, and work backward

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

QUICK REVIEW

Compare plots on a common scale for center, spread, and overlap. Dot plots show individual values; box plots show min, lower quartile, median, upper quartile, max. For $2, 3, 3, 4, 4, 5$, median 3.5 and range 3. Adding 3 to every value raises the median to 6.5 but keeps range 3. Quartiles are medians of the lower and upper halves.

Worked example

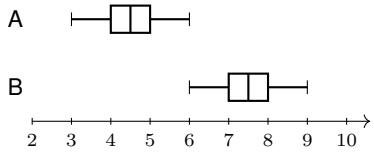
Compare ranges of $2, 3, 4$ and $1, 3, 5$.

1. First range $= 4 - 2 = 2$.
2. Second range $= 5 - 1 = 4$.
3. Both medians are 3, so equal center does not imply equal spread.
Answer: Ranges 2 and 4; first set is less spread.

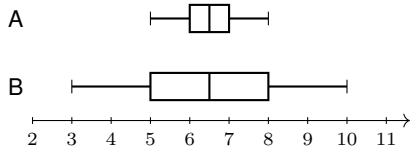
Practice Problems

Show your thinking.

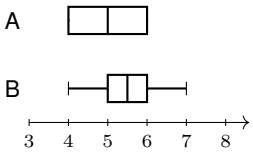
1. Read median lines from the box plots and compute their difference. Use A and B on the common scale.



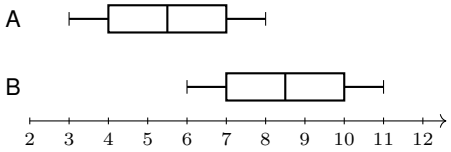
2. Read endpoints of both box plots. Compute and compare full ranges. Use A and B on the common scale.



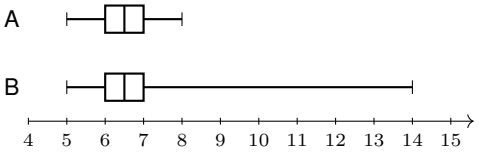
3. Read both middle boxes and find their interquartile ranges (IQRs). Use A and B on the common scale.



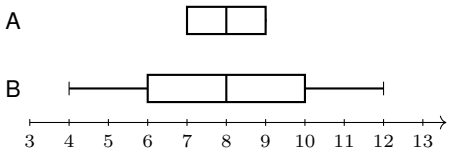
4. A student says shifting a box plot changes its range. Use medians and endpoints to test this. Use A and B on the common scale.



5. Does the larger displayed maximum also give a larger median in this pair? Read both. Use A and B on the common scale.



6. Use the box plots to show that equal medians can accompany unequal spreads. Use A and B on the common scale.



Answer Key

1. Medians A $\frac{9}{2}$, B $\frac{15}{2}$; ranges A 3, B 3.
2. Medians A $\frac{13}{2}$, B $\frac{13}{2}$; ranges A 3, B 7. A has the smaller range.
3. IQRs A 2 and B 1.
4. Medians A $\frac{11}{2}$, B $\frac{17}{2}$; ranges A 5, B 5. B is a shift of 3; the range is unchanged.
5. Medians A $\frac{13}{2}$, B $\frac{13}{2}$; ranges A 3, B 9. Maximum A 8, B 14; their medians are equal.
6. Medians A 8, B 8; ranges A 2, B 8. A has the smaller range.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Read A's median line at $\frac{9}{2}$. Its whisker tips are 3 and 6, so range $= 6 - 3 = 3$.

2. Read B's median line at $\frac{15}{2}$. Its whisker tips are 6 and 9, so range $= 9 - 6 = 3$.

3. Median gap B minus A $= 3$; range change $= 0$.

Problem 2

1. Read A's median line at $\frac{13}{2}$. Its whisker tips are 5 and 8, so range $= 8 - 5 = 3$.

2. Read B's median line at $\frac{13}{2}$. Its whisker tips are 3 and 10, so range $= 10 - 3 = 7$.

3. Median gap B minus A $= 0$; range change $= 4$.

Problem 3

1. A box edges: $Q_1 = 4$, $Q_3 = 6$; IQR $= 6 - 4 = 2$.

2. B box edges: $Q_1 = 5$, $Q_3 = 6$; IQR $= 6 - 5 = 1$.

3. The larger IQR indicates a wider middle half.

Problem 4

1. Read A's median line at $\frac{11}{2}$. Its whisker tips are 3 and 8, so range $= 8 - 3 = 5$.

2. Read B's median line at $\frac{17}{2}$. Its whisker tips are 6 and 11, so range $= 11 - 6 = 5$.

3. Median gap B minus A $= 3$; range change $= 0$.

Problem 5

1. Read A's median line at $\frac{13}{2}$. Its whisker tips are 5 and 8, so range $= 8 - 5 = 3$.

2. Read B's median line at $\frac{13}{2}$. Its whisker tips are 5 and 14, so range $= 14 - 5 = 9$.

3. Median gap B minus A $= 0$; range change $= 6$.

Problem 6

1. Read A's median line at 8. Its whisker tips are 7 and 9, so range $= 9 - 7 = 2$.

2. Read B's median line at 8. Its whisker tips are 4 and 12, so range $= 12 - 4 = 8$.

3. Median gap B minus A $= 0$; range change $= 6$.

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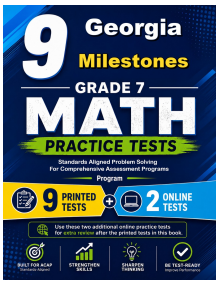

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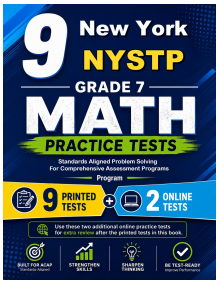

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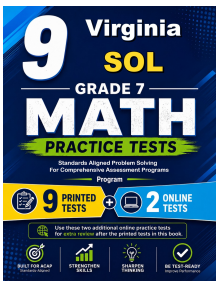

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