Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Comparing Data Distributions

Comparing Data Distributions | A1-U10-P06

96 problems · Four activity formats

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Topic focus

Across 96 tasks this topic asks for artifact, alignment operation, and supported comparison, before/after A summaries, fixed B summaries, and revised comparison, contextual comparison of center and spread with supported limitation, chosen center and spread plus purpose-specific justification, verified shared summaries and decisive structural difference and shape label qualified by tail, modes, gaps, clusters, and evidence.

8 PDFs and a README; 136 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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Algebra 1

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Name: _____ **Date:** _____ **Class:** _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Centers are close while spreads differ sharply. Context: part lengths. For Supplier A, the median is 100 millimeters and the IQR is 40 millimeters. For Supplier *B*, the corresponding values are 102 and 8 millimeters. Compare typical value and variability together, naming the groups and avoiding causal claims. Identify the more practically striking contrast.

Group	median (millimeters)	IQR (millimeters)
Supplier A	100	40
Supplier *B*	102	8

Bank label: _____

Both groups are tightly clustered. Context: task times. For Method A, the median is 12 minutes and the IQR is 2 minutes. For Method *B*, the corresponding values are 25 and 3 minutes. Compare typical value and variability together, naming the groups and avoiding causal claims. Describe separation using both summaries.

Group	median (minutes)	IQR (minutes)
Method A	12	2
Method *B*	25	3

Bank label: _____

Higher average accompanies higher variability. Context: daily output. For Plant A, the mean is 45 units and the standard deviation is 12 units. For Plant *B*, the corresponding values are 38 and 5 units. Compare typical value and variability together, naming the groups and avoiding causal claims. Avoid choosing a winner without a goal.

Group	mean (units)	standard deviation (units)
Plant A	45	12
Plant *B*	38	5

Bank label: _____

Average calibration agrees. Context: calibration readings. For Scale A, the mean is 200 grams and the standard deviation is 15 grams. For Scale *B*, the corresponding values are 200 and 4 grams. Compare typical value and variability together, naming the groups and avoiding causal claims. Use standard deviation to compare repeatability.

Group	mean (grams)	standard deviation (grams)
Scale A	200	15
Scale *B*	200	4

Bank label: _____

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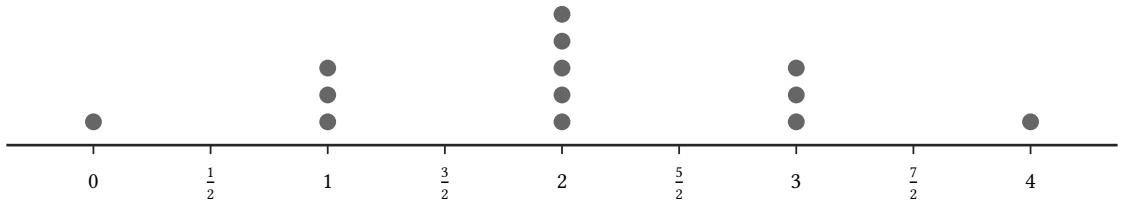
Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

The frequencies mirror around 2. An exact dot plot has horizontal values 0, 1, 2, 3, 4 and corresponding frequencies 1, 3, 5, 3, 1. Describe the supported distribution shape, including tail direction, modality, and any meaningful gap or cluster. Name the center of symmetry.



points

Value	Frequency
0	1
1	3
2	5
3	3
4	1

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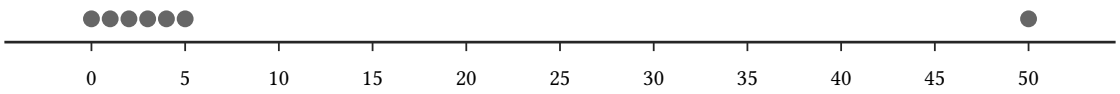
Name: _____ **Date:** _____ **Class:** _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: a after: iqr: 10; mean: $\frac{52}{3}$; median: 8; n: 9; range: 100; a before: iqr: 8; mean: 7; median: 7; n: 8; range: 14; b: iqr: 10; mean: 9; median: 9; n: 9; range: 16; conclusion: Mean and range surge; the odd-sample *re*-split can also alter $Q3$ and IQR even though the new value lies far outside the middle.

A initially appears far more variable by range. Group A initially has $0, 1, 2, 3, 4, 5, 50$ units; Group B has $0, 2, 4, 6, 8, 10$. Remove 50 from A for a declared sensitivity analysis. Group A becomes $0, 1, 2, 3, 4, 5$. Recompute A's mean, median, range, and IQR, then revise the A-versus-B comparison. Re-evaluate range and IQR rankings separately. For quartiles, use the median of each half; for odd sample sizes, exclude the overall median from both halves.



Value	Frequency
0	1
1	1
2	1
3	1
4	1
5	1
50	1

Value	Frequency
0	1
1	1
2	1
3	1
4	1
5	1

Value	Frequency
0	1
2	1
4	1
6	1
8	1
10	1

Your response: _____

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Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Two classes share one typical score. Context: test scores. For Class A, the median is 70 points and the IQR is 8 points. For Class B, the corresponding values are 70 and 20 points. Compare typical value and variability together, naming the groups and avoiding causal claims. State which is more consistent.

Group	median (points)	IQR (points)
Class A	70	8
Class B	70	20

The middle-half spreads match. Context: travel times. For Route A, the median is 18 minutes and the IQR is 6 minutes. For Route B, the corresponding values are 23 and 6 minutes. Compare typical value and variability together, naming the groups and avoiding causal claims. Describe the location shift.

Group	median (minutes)	IQR (minutes)
Route A	18	6
Route B	23	6

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Full Worked Solutions - excerpt

Worked example

Problem. A few large observations pull the tail right. The distribution is described as strongly right-skewed with a long high-value tail. The reporting goal is to report a resistant typical value and middle spread. Choose a center/spread pair and justify its sensitivity or robustness. No formula computation is requested.

Answer. center: median; justification: Median and IQR resist the high tail better than mean and standard deviation.; spread: IQR

Explanation and check.

Use median with IQR. Median and IQR resist the high tail better than mean and standard deviation.

Worked example

Problem. Reorder one fixed multiset into two datasets that have different distribution shapes or different numbers of modes. Decide whether the requested pair can exist, and justify without inventing data.

Answer. possible: False; proof: Impossible: reordering does not change value frequencies, so the empirical distribution and its modes remain the same.

Explanation and check.

Impossible: reordering does not change value frequencies, so the empirical distribution and its modes remain the same.