

YOU WILL NEED

- calculator
- grid paper

GOAL

Explore the similarities and differences between two sets of data.

EXPLORE the Math

Paulo needs a new battery for his car. He is trying to decide between two different brands. Both brands are the same price. He obtains data for the lifespan, in years, of 30 batteries of each brand, as shown below.



Measured Lifespans of 30 Car Batteries (years)									
Brand X					Brand Y				
5.1	7.3	6.9	4.7	5.0	5.4	6.3	4.8	5.9	5.5
6.2	6.4	5.5	5.7	6.8	4.7	6.0	4.5	6.6	6.0
6.0	4.8	4.1	5.2	8.1	5.0	6.5	5.8	5.4	5.1
6.3	7.5	5.0	5.7	8.2	5.7	6.8	5.6	4.9	6.1
3.3	3.1	4.3	5.9	6.6	4.9	5.7	6.2	7.0	5.8
5.8	6.4	6.1	4.6	5.7	6.8	5.9	5.3	5.6	5.9

- ?** How can you compare the data to help Paulo decide which brand of battery to buy?

Reflecting

- Describe how the data in each set is distributed. Describe any similarities and differences between the two sets of data.
- Explain why the mean and median do not fully describe the difference between these two brands of batteries. Consider the range, which is one measure of **dispersion** for data. Explain what additional information can be learned from the range of the data.
- Is the mode useful to compare in this situation? Explain.
- Suppose that one battery included in the set of data for brand Y is defective, and its lifespan is 0.5 years instead of 5.9 years. Discuss how this would or would not affect Paulo's decision.

dispersion

A measure that varies by the spread among the data in a set; dispersion has a value of zero if all the data in a set is identical, and it increases in value as the data becomes more spread out.

In Summary

Key Ideas

- Measures of central tendency (mean, median, mode) are not always sufficient to represent or compare sets of data.
- You can draw inferences from numerical data by examining how the data is distributed around the mean or the median.

Need to Know

- To compare sets of data, the data must be organized in a systematic way.
- When analyzing two sets of data, it is important to look at both similarities and differences in the data.

FURTHER Your Understanding

1. a) Construct a graph to illustrate the average daily temperatures in Langley, British Columbia, and Windsor, Ontario.

Average Daily Temperatures in Langley, BC												
Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
average daily temperature (°C)	2.2	4.4	6.3	8.6	11.8	14.2	16.7	17.0	14.2	9.8	5.1	2.7

Average Daily Temperatures in Windsor, ON												
Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
average daily temperature (°C)	-4.5	-3.2	2.0	8.2	14.9	20.1	22.7	21.6	17.4	11.0	4.6	-1.5

Environment Canada

- b) Determine the range, mean, and median for the average daily temperatures in the two cities.
- c) Use your graph and your results from part b) to compare the temperatures in the two cities.
- d) Why might a comparison of the two sets of data be useful?

2. a) Use the range and measures of central tendency (mean, median, and mode) to compare the results for two geography tests given by the same teacher to the same class in the same semester.

Unit 1 Test				
81	76	73	71	64
80	75	73	71	63
79	75	73	68	61
79	74	73	67	58
78	73	72	66	57

Unit 2 Test				
98	84	73	71	57
95	81	73	69	53
93	79	73	64	44
89	79	73	59	41
87	76	73	59	37

- b) Did the class perform better on the Unit 1 test or Unit 2 test? Justify your decision.
- c) Were the modes useful to compare in this situation? Explain.
3. a) Describe the distribution of data for average housing prices in 11 major Canadian cities in 1996, 1998, and 2000. Then compare the three sets of data.

Average Housing Prices (\$)			
City	1996	1998	2000
St. John's	116 443	118 519	137 665
Halifax	117 990	141 353	156 988
Toronto	206 738	220 049	224 246
Winnipeg	144 858	161 337	166 761
Regina	147 889	152 784	152 114
Calgary	157 768	180 258	193 275
Edmonton	146 280	164 808	172 503
Vancouver	212 010	218 025	236 617
Victoria	208 400	246 135	228 983
Whitehorse	157 677	167 396	170 986
Yellowknife	181 790	175 646	221 632

Statistics Canada

- b) Why might a comparison of the three sets of data be useful?