Describing Data: Center, Spread, and Shape

Name: _____	Date: _____	Score: _____ / 24

Quick Review

When you collect data, you can describe it in three ways. The **center** is a typical value — the **mean** (average) or the **median** (middle value). The **spread** tells how far the data stretches — the **range** is the largest value minus the smallest. The **shape** describes the overall pattern: data can be **symmetric** (balanced around the center), **skewed** (a tail stretching one way), or have a **cluster** or a **gap**. Together, center, spread, and shape give a clear picture of the data.

◇ **Example:** For the data $5, 7, 7, 8, 9, 12$, find the range and describe the center.

⇒ Start with the spread. The largest value is 12 and the smallest is 5, so the range is $12 - 5 = 7$. Now the center: add all six values, $5 + 7 + 7 + 8 + 9 + 12 = 48$, and divide by 6 to get a mean of 8. The median is the average of the two middle values, 7 and 8, which is 7.5. So a typical value is about 8, and the data spreads across a range of 7.

Answer: range $= 7$, mean $= 8$

PRACTICE

Describe the center or spread of each data set as asked.

1. Range of $3, 5, 8, 10$ _____
2. Range of $12, 4, 9, 20, 7$ _____
3. Range of $15, 15, 15, 15$ _____
4. Range of $6, 1, 9, 4, 11, 2$ _____
5. Range of $40, 25, 60, 35$ _____
6. Mean of $4, 6, 8, 10$ _____
7. Mean of $2, 5, 8$ _____
8. Mean of $10, 20, 30, 40, 50$ _____
9. Median of $3, 7, 9$ _____
10. Median of $2, 4, 6, 8$ _____
11. Median of $1, 3, 5, 7, 9$ _____
12. Median of $10, 14, 11, 17$ _____
13. Range of $100, 50, 75, 90, 60$ _____
14. Mean of $7, 7, 7, 7$ _____
15. Median of $8, 2, 6, 4, 10, 12$ _____
16. Range of $18, 9, 9, 18$ _____
17. Mean of $12, 18, 24$ _____
18. Median of $5, 5, 8, 10, 12$ _____
19. Range of $7, 7, 7, 7, 7$ _____
20. Mean of $6, 6, 12, 12$ _____

Word Problems

21. The daily high temperatures for a week were $68, 70, 72, 71, 69, 73, 67$ degrees. Find the range and the mean. _____

22. A class measured the lengths of 5 leaves in centimeters: $8, 8, 9, 12, 13$. Is the data clustered low, clustered high, or spread evenly? Find the range too. _____

23. Eight friends counted the apps on their phones: $10, 12, 12, 13, 14, 15, 15, 49$. Which value looks unusual, and what is the range? _____

24. A baker recorded muffins sold each day: $20, 22, 21, 23, 22, 20, 24$. Find the mean and describe whether the data is fairly steady or very spread out. _____

Answer Keys

1. $\boxed{7}$
2. $\boxed{16}$
3. $\boxed{0}$
4. $\boxed{10}$
5. $\boxed{35}$
6. $\boxed{7}$
7. $\boxed{5}$
8. $\boxed{30}$
9. $\boxed{7}$
10. $\boxed{5}$
11. $\boxed{5}$
12. $\boxed{\frac{25}{2}}$
13. $\boxed{50}$
14. $\boxed{7}$
15. $\boxed{7}$
16. $\boxed{9}$
17. $\boxed{18}$
18. $\boxed{8}$
19. $\boxed{0}$
20. $\boxed{9}$
21. $\boxed{\text{range} = 6,\ \ \text{mean} = 70}$
22. $\boxed{\text{clustered low; range} = 5}$
23. $\boxed{49 \text{ is unusual; range} = 39}$
24. $\boxed{\text{mean} = 21\frac{6}{7};\ \text{fairly steady}}$

Step-by-Step Explanations

1. Range is largest minus smallest: $10 - 3 = 7$.
2. The largest value is 20 and the smallest is 4, so $20 - 4 = 16$.
3. All values are the same, so the range is $15 - 15 = 0$.
4. The biggest is 11 and the smallest is 1: $11 - 1 = 10$.
5. Subtract the smallest from the largest: $60 - 25 = 35$.
6. Add to get 28, then divide by 4: $28 \div 4 = 7$.
7. The sum is 15, and $15 \div 3 = 5$.
8. The total is 150, and $150 \div 5 = 30$.
9. With three values in order, the middle one is 7.
10. With four values, average the two middle ones: $(4 + 6) \div 2 = 5$.
11. In order, the middle of five values is 5.
12. Order them: $10, 11, 14, 17$. The middle two are 11 and 14, so the median is 12.5.
13. Largest minus smallest: $100 - 50 = 50$.
14. The sum is 28, and $28 \div 4 = 7$ — equal values keep the same mean.
15. Order them: $2, 4, 6, 8, 10, 12$. Average the middle two, 6 and 8, to get 7.
16. The largest is 18 and the smallest is 9: $18 - 9 = 9$.
17. Add to get 54, then $54 \div 3 = 18$.
18. In order, the middle value of five numbers is 8.
19. Every value is 7, so the range is 0 — no spread at all.
20. The sum is 36, and $36 \div 4 = 9$.
21. The highest is 73 and the lowest is 67, so the range is $73 - 67 = 6$. The seven values add to 490, and $490 \div 7 = 70$ degrees.
22. Three of the five leaves are 8 or 9 cm, so the data clusters at the low end with two larger values. The range is $13 - 8 = 5$ cm.
23. Seven values sit between 10 and 15, but 49 is far above the rest — it is an outlier. The range is $49 - 10 = 39$, stretched wide by that one value.
24. The seven values add to 152, so the mean is $152 \div 7 \approx 21.7$. Since every day is between 20 and 24, the range is only 4 — the sales are fairly steady.

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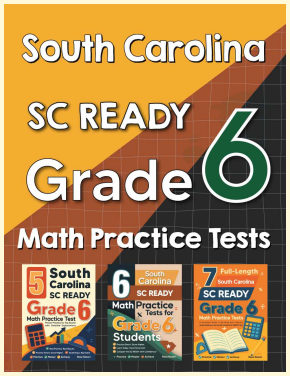

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