Name & Surname: _____ Class: _____ Date: _____

Mean, Median and Spread

Find the center and describe the data

About 45 minutes Level ★★★☆☆



Center and Variability

Data have a **center** and a **spread**. Use both to describe what is typical.

- **Mean**: add all values, then ÷ by the count.
- **Median**: order least to greatest, then pick the **middle** value. For an even count, average the middle two.
- **Variability**: range = max − min; interquartile **range** = Q3 − Q1; mean absolute **deviation** = mean distance from the mean.
- **Pattern**: most values may cluster. A far-off **outlier** is a striking deviation and pulls the mean.

Key words

mean: average found by total divided by count

median: middle value when data are in order

range: difference between greatest and least values

interquartile range: spread of middle half, Q3 minus Q1

mean absolute deviation: average distance of values from the mean

outlier: value far from the rest of the data

Task A

/6

Find the mean, median and range for each set. Circle any striking value.

1 Minutes reading each day for 7 days

20	25	30	20	35	25	20

In order: ☐ ☐ ☐ ☐ ☐ ☐ ☐

Mean: _____ **Median:** _____

Range: _____

2 Points scored in 9 tries at a target game

10	12	11	10	13	11	10	12	28

In order: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Mean: _____ **Median:** _____

Range: _____

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Practice With Centers

Practice finding mean, median and range fluently.

Task B /12

Work through each section. Show ordering for median and totals for mean.

WARM UP

1. Work out the **mean** of 6, 8, and 10.

   Answer: _____

2. Work out the **mean** of 20, 30, 40, and 50.

   Answer: _____

3. Find the **median** of 9, 3, and 7.

   Answer: _____

4. Find the **range** of 5, 11, 8, and 14.

   Answer: _____

PRACTICE

5. Find the **median** of 12, 18, 22, 24, 30, and 33.

   Answer: _____

6. Work out the **mean** of 2, 5, 6, and 7.

   Answer: _____

7. Data in order: 4, 6, 8, 10, 12, 14, 16. The lower **quartile** is 6 and the upper **quartile** is 14. Find the interquartile **range**.

   Answer: _____

8. Student A says the **mean** is always one of the data values. Explain how you know she is wrong.

   Answer: _____

PROBLEM SOLVING

9. Quiz scores in **points** are 70, 80, 80, 90, 90, and 100. Find the **mean**.

   Answer: _____

10. Data: 5, 7, 9, 11. The **mean** is 8. Find the mean absolute **deviation**.

    Answer: _____

11. Jump counts: 10, 10, 11, 11, 12, 50. Find the **median**.

    Answer: _____

12. Explain how you know 50 is a striking **deviation** and what it does to the **mean**.

    Answer: _____

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Variability and Patterns

Use IQR and MAD to describe spread and striking values.

Task C /12

Focus on variability and context. Explain what the numbers mean for the data.

WARM UP

1. Find the **range** of 19, 22, 27, and 35.

Answer: _____

2. Find the **median** of 15, 20, 25, 30, and 45.

Answer: _____

3. Work out the **mean** of 12, 12, and 18.

Answer: _____

4. The lower **quartile** is 10 and the upper **quartile** is 22. Find the interquartile **range**.

Answer: _____

PRACTICE

5. Data: 6, 6, 10, 10. The **mean** is 8. Find the mean absolute **deviation**.

Answer: _____

6. Data in order: 2, 4, 6, 8, 10, 12. The lower **quartile** is 4 and the upper **quartile** is 10. Find the interquartile **range**.

Answer: _____

7. Find the **median** of 30, 35, 40, 40, and 100.

Answer: _____

8. Student B says a large **range** always means a large mean absolute **deviation**. Explain how you know he may be wrong.

Answer: _____

PROBLEM SOLVING

9. Heights of five plants in **inches**: 6, 8, 7, 9, and 10. Find the **mean**.

Answer: _____

10. Seven **temperatures** in °F: 68, 70, 69, 71, 70, 69, 77. Find the **median**.

Answer: _____

11. For the **temperatures** above, the **mean** is about 70.6°F. Explain how you know 77°F pulls the **mean** above most values.

Answer: _____

12. Lunch costs in **dollars**: $4, $5, $5, $6, $15. Which **center** best shows a typical cost, the mean or the **median**? Explain how you know.

Answer: _____

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Think Deeper About Data

Explain your thinking and spot patterns in sequences.

Task D

/6

Answer each question in order. Use full sentences for reasoning.

Remember State the **steps** to find the **median** of a data set.

Understand Explain the **difference** between **mean** and **median**.

Apply Find the **mean** and **median** of 10, 12, 11, 10, 13, 11, 10, 12, and 28.

Analyse Compare the **mean** and **median** above. What **pattern** and striking **deviation** do you see?

Evaluate Lunch costs are **$4, $5, $5, $6, $15**. Decide which **center** is more typical and justify with **variability**.

Create Create your own **data** set of 5 values with **mean** greater than **median**. List values and both **centers**.

Task E

/6

Complete each sequence. Then find its mean if you can.

1. 5, 8, 11, 14, ____, ____
2. 40, 36, ____, 28, ____, 20
3. 2, 6, 18, 54, ____, ____

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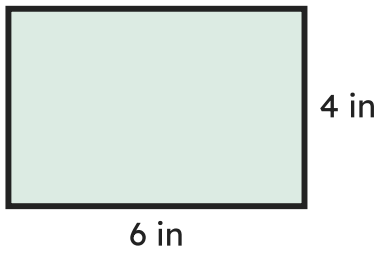
Area and Review

Review area skills and see a model for data problems.

Task F /4

Find the area and perimeter asked for. Use square inches for area.

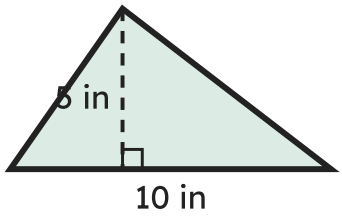
1



Area: _____ **in²**

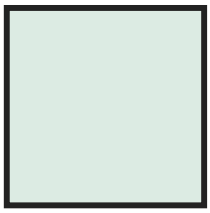
Perimeter: _____ **in**

2



Area: _____ **in²**

3



Perimeter: _____ **in**

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Mean, Median and Spread

Task G /2

Study each model, then try the matching question with the same steps.

WORKED EXAMPLE

Find the mean of 8, 10, and 12.

1. Add: 8 + 10 + 12 = 30
2. Divide by count: 30 ÷ 3 = 10
3. Mean = 10

Answer: 10

YOUR TURN

Find the mean of 7, 9, and 14.

Answer: _____

WORKED EXAMPLE

Data in order: 4, 6, 8, 10, 12, 14, 16. Lower quartile is 6, upper quartile is 14. Find the interquartile range.

1. Identify **quartiles**: Q1 = 6, Q3 = 14
2. Subtract: 14 − 6 = 8
3. Interquartile range = 8

Answer: 8

YOUR TURN

Data in order: 2, 4, 6, 8, 10, 12. Lower quartile is 4, upper quartile is 10. Find the interquartile range.

Answer: _____

How did I do?

Circle a face for each line.

I can find the mean and median of a data set.	☹	😐	☺
I can find range, interquartile range and mean absolute deviation.	☹	😐	☺
I can describe patterns and striking deviations in context.	☹	😐	☺

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Answer sheet: Mean, Median and Spread

Task A

1. In order: 20, 20, 20, 25, 25, 30, 35. Mean 25; Median 25; Range 15
2. In order: 10, 10, 10, 11, 11, 12, 12, 13, 28. Mean 13; Median 11; Range 18

Task B

1. 8
2. 35
3. 7
4. 9
5. 23
6. 5
7. 8
8. She is wrong because the mean can fall between values, for example the mean of 6 and 7 is $6\frac{1}{2}$, which is not in the data set.
9. 85
10. 2
11. 11
12. 50 is far above the 10-12 cluster, so it is a striking deviation. It pulls the mean up to $17\frac{1}{3}$ while the median stays at 11.

Task C

1. 16
2. 25
3. 14
4. 12
5. 2
6. 6
7. 40
8. He may be wrong because one outlier can make the range large while most values stay close to the mean, so the mean absolute deviation stays small.
9. 8
10. 70
11. 77 is well above the 68-71 cluster, so its extra distance adds to the total and pulls the mean above the median of 70.
12. The median of $5 is better because $15 is a striking deviation that pulls the mean up to $7, which is higher than 4 of the 5 costs.

Task D

1. Order values least to greatest, then pick the middle value. If there are two middle values, average them.
2. The mean uses all values to balance the total, while the median is only the middle ordered value, so the median resists outliers.
3. Mean is 13, median is 11.
4. Most values cluster at 10-13, but 28 is far above. It pulls the mean to 13, above the median of 11.
5. Median $5 is more typical. Range $11 is large because of $15, and mean $7 is pulled up, while 4 of 5 costs are $6 or less.
6. Example: 4, 5, 5, 6, 20. Median is 5 and mean is 8, so mean is greater because of 20.

Task E

1. 17, 20
2. 32, 24
3. 162, 486

Task F

1. area = 24 in², perimeter = 20 in
2. area = 25 in²
3. perimeter = 20 in

Task G

1. 10
2. 6

Pictures: Microsoft Fluent Emoji (MIT)

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