

Mean, median and mode: calculate and compare

Compare your reasoning, not just the final result. Equivalent correct methods are welcome.

Public practice with published answers. This is not a full-topic readiness assessment.

1. An invented list of four reading-session lengths is 7, 5, 9, 3 minutes. Put it in order and find the median. Show why you use two middle values.

Worked solution 1: Ordered: 3, 5, 7, 9. Median: 6 minutes.

1. Arrange the four observations: 3, 5, 7, 9.
2. An even count has two middle observations, 5 and 7.
3. Median = $(5 + 7) \div 2 = 6$ minutes; it need not be an observed value.

2. Five paper towers have heights 8, 10, 6, 12, 9 cm. Calculate their mean, showing the total and divisor.

Worked solution 2: 9 cm.

1. Total height = $8 + 10 + 6 + 12 + 9 = 45$ cm.
2. There are five towers, so mean = $45 \div 5 = 9$ cm.

3. An invented list of daily badge counts is 2, 4, 2, 6, 4, 7. Find every mode and the median. Explain why there is more than one mode.

Worked solution 3: Modes: 2 and 4. Median: 4.

1. Ordered list: 2, 2, 4, 4, 6, 7.
2. 2 and 4 each occur twice, tying for highest frequency; both are modes.
3. The middle observations are 4 and 4, giving $(4 + 4) \div 2 = 4$.

4. Four practice times are 4, 6, 8, 10 minutes. Add a fifth time of 32 minutes. Find the mean and median before and after, then compare their changes.

Worked solution 4: Before: mean 7, median 7. After: mean 12, median 8. The mean rises by 5 minutes; the median rises by 1 minute.

1. Before: total 28, mean $28/4 = 7$; median $(6 + 8)/2 = 7$.
2. After: ordered list 4, 6, 8, 10, 32; total 60, mean $60/5 = 12$.
3. The new middle observation is 8. Changes are $12 - 7 = 5$ and $8 - 7 = 1$ minute.
4. The large new value affects the total strongly but does not become the middle observation.

5. Five quiz-practice scores have a mean of 14 points. Four scores are 11, 13, 16 and 12 points. Find the missing score and check the mean.

Worked solution 5: 18 points.

1. Mean $\times$ count gives total: $14 \times 5 = 70$ points.
2. Known total = $11 + 13 + 16 + 12 = 52$.
3. Missing score = $70 - 52 = 18$. Check: $(52 + 18) \div 5 = 14$.

6. Five invented weekend screen-time records are 20, 25, 25, 30, 150 minutes. Calculate mean, median and mode. Which of the mean or median better describes the cluster of shorter records here? Explain without deleting the 150-minute record.

Worked solution 6: Mean 50 minutes; median 25 minutes; mode 25 minutes. The median better describes the cluster from 20 to 30 minutes.

1. Total = $20 + 25 + 25 + 30 + 150 = 250$; mean = $250/5 = 50$ minutes.
2. The middle observation is 25. It also occurs most often, so median and mode are both 25.
3. Four records lie between 20 and 30; the median describes that cluster better. The mean still correctly represents the total shared equally, including 150.
4. Report the unusually large record rather than silently removing it.