PROBLEM-SOLVING AND DATA ANALYSIS / 01 UNDERSTAND

Mean and total

An illustrated lesson ▪ Theory, reasoning and worked examples

Mean redistributes a total equally

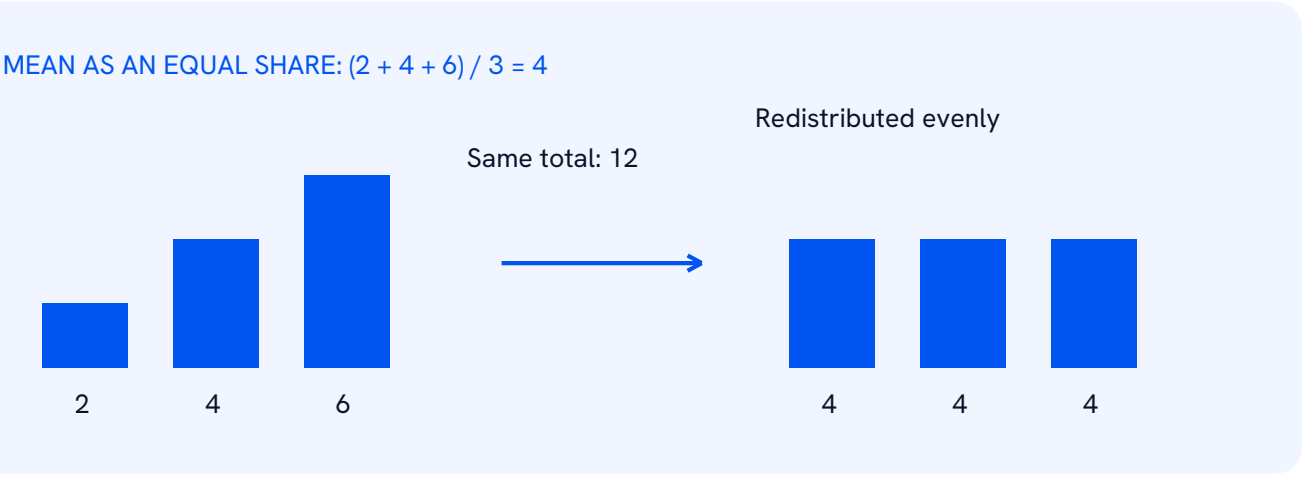
The arithmetic mean is the sum of the values divided by their count. It answers the question: if the total were shared evenly, how much would each entry receive? A mean need not appear in the data and need not be a whole number. It is a summary of the entire set, not a selected middle observation.

The total is often the hidden quantity

If n observations have mean m, their total is nm. This identity is especially useful when the original values are not listed. A group of 12 scores with mean 75 has total 900, regardless of how the individual scores are distributed. Many missing-value problems become simple total-accounting problems.

Mean and median react differently

The mean uses every value and is sensitive to unusually large or small observations. The median is the middle of the ordered list and depends on position. In 2, 3, 4, 5, 100, the mean is 22.8 but the median is 4. Neither statistic alone describes every feature of a distribution.



Illustrative teaching diagram. Values and examples are explained in the lesson.

THE ESSENTIAL IDEA

Mean = total divided by the number of values.

PROBLEM-SOLVING AND DATA ANALYSIS / 02 BUILD THE METHOD

From idea to method

Add or remove a value using totals

Five observations with mean 8 have total 40. Adding a value of 14 gives total 54 and count 6, so the new mean is 9. The denominator changes with the number of observations; keeping the old count is a common source of error.

Combine groups with weights

To combine groups, add their totals and divide by their combined count. A group of 10 with mean 70 contributes 700; a group of 30 with mean 90 contributes 2700. The combined mean is 3400/40 = 85, not the unweighted average 80.

Use transformations efficiently

Adding a constant k to every observation adds k to the mean. Multiplying every observation by k multiplies the mean by k. This follows from distributing the same operation across the sum. Adding k to only one observation changes the mean by k/n, not k.

WORKED EXAMPLE / FIND A MISSING SCORE

Four scores have mean 18. Three scores are 12, 17 and 20. Find the fourth.

01 Set up the reasoning

The required total is 4 × 18 = 72.

02 Apply the relationship

The known total is 12 + 17 + 20 = 49.

03 Interpret and check

The missing score is 72 - 49 = 23. Check: (12 + 17 + 20 + 23)/4 = 18.

Keep these distinctions handy

Recover a total	Total = mean × count.
Combined mean	Sum of group totals / sum of group counts.
One new observation	New mean = (old total + new value)/(old count + 1).

PROBLEM-SOLVING AND DATA ANALYSIS / 03 CONNECT & REMEMBER

See the deeper pattern

Predict the direction before calculating

Adding a value above the current mean raises the mean; adding one below it lowers the mean; adding a value equal to the mean leaves it unchanged. Removing a value reverses this effect. This prediction is a useful check on a computed result, especially when several values are added or removed.

ONE MORE WORKED APPLICATION

What is the mean of 4, 10, and 6?

1. Total = 20.

2. Divide by 3: 20/3.

Answer: 20/3

Mistakes to recognize

- Sort data to find a median, but sorting is unnecessary for a mean.
- Do not average group means unless the group sizes are equal.
- Track both total and count after every change.

A quick understanding check

What total corresponds to 8 observations with mean 12?

Explanation: 96, because total = count × mean.

MORE PRACTICE IN YOUR DASHBOARD

Open prepvora.com/app/ and use the SAT question bank. Work on Problem-Solving and Data Analysis, then look for mean and total questions. Solve independently before reviewing the explanation. Use this guide for the theory; use the dashboard for a longer practice session.

Open your dashboard → | Explore the resource library →

Original Prepvora explanations and examples. Scope: this topic, not the entire SAT syllabus. 2026-10-01 ▪ theory-v2