THE QUESTION | AVERAGE IN PARTS

A student appeared in 6 papers. The maximum marks are the same for each paper. His marks in these papers are in the proportion of 5 : 6 : 7 : 8 : 9 : 10. Overall he scored 60%. In how many number of papers did he score less than 60% of the maximum marks?

Ratios | Averages | Hidden Trap: trying to find the maximum marks

(a) 2
Misses the paper with 7 parts. 7 is below the average of 7.5.

(b) 3 ✓
Papers with 5, 6 and 7 parts are below the average part of 7.5.

(c) 4
Counts the paper with 8 parts, which is above 7.5.

(d) 5
Would need the average to sit at 9, but it is 7.5.

CRACK THE HIDDEN RULE

With equal maximum marks, the overall 60% is the average of the six papers. In parts, the average is the total parts divided by 6.

A paper is below 60% exactly when its parts are below that average. No need to find the actual marks.

Average part = 45 / 6 = 7.5, and that equals 60%

TOTAL PARTS	AVERAGE PART	BELOW 7.5
5+6+7+8+9+10 = 45	45 / 6 = 7.5 (60%)	5, 6 and 7 = 3 papers

WORKED IN 3 CLEAN STEPS

1 Add the parts
5 + 6 + 7 + 8 + 9 + 10 = 45 parts.

2 Find the average part
45 / 6 = 7.5 parts. This is the 60% mark.

3 Count papers below it
5, 6 and 7 are below 7.5, so 3 papers. Check: 7.5 parts = 60%, so 7 parts = 56%.

ANSWER: (b) 3

THE 3-SECOND SHORTCUT

Equal maximum marks means the average part equals the overall percentage. Compute 45 / 6 = 7.5 and count the parts below it.

equal max, so average = overall % | average in parts | count parts below

→ The parts are consecutive, so the average sits between 7 and 8.
→ Paper with 7 parts scores 56%, which is below 60%.

WHY ASPIRANTS LOSE MARKS HERE

1. **Hunting for the maximum marks.** It cancels out, because every paper has the same maximum.
2. **Counting the 7 as at or above average.** 7 is below 7.5, so it scores less than 60%.
3. **Adding 45 but dividing by 5.** There are 6 papers.

ATTEMPT	FLAG	SKIP
~30 sec	if parts look like marks	never
One sum and one division.	Remember they are only parts of a common maximum.	A fast scorer.

THE ONE-LINE TAKEAWAY

With equal maximums, the overall percentage is the average part. Count the parts below it.

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