

Mean of Grouped Data — Class 10 Summary

NCERT Chapter 13, Statistics · Section 13.2 · Exercise 13.1 · CBSE Class 10 Maths

$\bar{x} = \Sigma f_i x_i / \Sigma f_i$ — replace every class by its class mark, weight it by the frequency, then divide by the total frequency.

Everything starts with the class mark

Grouped data gives you intervals, not values, so each class is represented by its **class mark** — the mid-point of the interval. Every value in a class is assumed to sit there.

Class mark x_i = (lower class limit + upper class limit) / 2

Class interval	Frequency f_i	Class mark x_i	$f_i x_i$
0 – 10	7	5	35
10 – 20	10	15	150
20 – 30	15	25	375
30 – 40	8	35	280
40 – 50	10	45	450
Total	$\Sigma f_i = 50$	—	$\Sigma f_i x_i = 1290$

$\bar{x} = 1290 / 50 = \mathbf{25.8}$. This one data set is used for all three methods below, and all three return 25.8.

Three methods, one answer

Method	Formula	Reach for it when
Direct	$\bar{x} = \Sigma f_i x_i / \Sigma f_i$	Class marks and frequencies are small numbers.
Assumed mean	$\bar{x} = a + \Sigma f_i d_i / \Sigma f_i$ $d_i = x_i - a$	Class marks are large, so subtracting a central value shrinks the arithmetic.
Step deviation	$\bar{x} = a + h \times (\Sigma f_i u_i / \Sigma f_i)$ $u_i = (x_i - a) / h$	Class sizes are equal, so the deviations share the factor h. Fastest of the three.

On the table above, with $a = 25$ and $h = 10$: $\Sigma f_i d_i = 40$ gives $25 + 40/50 = \mathbf{25.8}$, and $\Sigma f_i u_i = 4$ gives $25 + 10 \times (4/50) = \mathbf{25.8}$. **The mean never depends on your choice of a or h.**

Where this sits in NCERT and CBSE

NCERT sets the scope. Chapter 13, *Statistics*, **Section 13.2 Mean of Grouped Data**, Examples 1 to 3, and **Exercise 13.1 (9 questions)**. Watch the offset: the topic is Section 13.2 but the exercise is 13.1, because Section 13.1 is the introduction and has no exercise.

CBSE sets the shape. 38 questions, 80 marks, three hours, no overall choice — Section A 20×1 , B 5×2 , C 6×3 , D 4×5 , E $3 \times 4 = 80$. The mean is usually a **3-mark Section C** question, or one part of a 5-mark or case-study question.

CBSE sets priority by unit, not by chapter. Number Systems 6, Algebra 20, Coordinate Geometry 6, Geometry 15, Trigonometry 12, Mensuration 10, **Statistics and Probability 11** = 80. Chapter-level percentage tables online are unofficial estimates.

Still on the syllabus: all three methods, including step deviation. Lists that show it as deleted come from the temporary 2020-21 reduced syllabus. What the rationalisation actually removed from this chapter is the **cumulative frequency graph (ogive)**, so you will not be asked to draw one.

Key takeaways

- ▶ $\bar{x} = \Sigma f_i x_i / \Sigma f_i$, with x_i the class mark of each class.
- ▶ **Class mark = (lower limit + upper limit) / 2**. Find every one before you start.
- ▶ Direct, assumed-mean and step-deviation are the **same method rearranged** — all gave 25.8.
- ▶ Deviations below a are **negative**. Losing a sign is the most common lost mark.
- ▶ In step deviation, **multiply back by h** at the end: $a + h \times (\Sigma f_i u_i / \Sigma f_i)$.
- ▶ **NCERT Ch. 13 §13.2, Exercise 13.1**; Statistics and Probability is **11 of 80** marks.

One Question, Two Methods, One Answer

Written the way a CBSE answer script should look — the table is part of the answer

3 MARKS · SECTION C

Find the mean daily wage of the 50 workers

Daily wages in Rs. Notice the class marks are in the hundreds — this is exactly the case the direct method makes painful and the step-deviation method makes easy.

Daily wages (Rs)	Workers f_i	Class mark x_i	$u_i = (x_i - 550)/20$	$f_i u_i$
500 – 520	12	510	-2	-24
520 – 540	14	530	-1	-14
540 – 560	8	550	0	0
560 – 580	6	570	1	6
580 – 600	10	590	2	20
Total	$\Sigma f_i = 50$	—	—	$\Sigma f_i u_i = -12$

Step 1 — class marks: $(500 + 520)/2 = 510$, and so on in steps of 20. **Step 2** — take $a = 550$ (a central class mark) and $h = 20$ (the class size). **Step 3** — $u_i = (x_i - 550)/20$ gives the whole numbers -2, -1, 0, 1, 2. **Step 4** — $\bar{x} = a + h \times (\Sigma f_i u_i / \Sigma f_i) = 550 + 20 \times (-12/50) = 550 - 4.8 = \text{Rs } 545.20$.

Check: by the direct method $\Sigma f_i x_i = 6120 + 7420 + 4400 + 3420 + 5900 = 27260$, and $27260 / 50 = 545.2$ — the same answer with far more arithmetic. The mean also sits between 510 and 590, as it must.

WHERE THE MARKS ACTUALLY GO

Four one-line failure modes, in the order examiners meet them:

What the student does	What it costs
Uses class limits instead of class marks	Every product is wrong; the method mark goes too.
Drops a minus sign in d_i or u_i	The mean lands on the wrong side of a — one mark, always.
Forgets the $\times h$ in step deviation	Answer off by a factor of h ; the final accuracy mark.
Writes only the final number	Most of a 3-mark question — the table <i>is</i> the working.

NOW TRY THIS ONE

Missing frequency

The mean of the following distribution is 27. Find the missing frequency p .

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	4	6	p	10	5

Set up $\Sigma f_i x_i = 27 \times \Sigma f_i$, solve the linear equation in p , then substitute back and re-compute the mean to confirm. **Answer: $p = 5$** , giving $\Sigma f_i = 30$, $\Sigma f_i x_i = 810$ and $810/30 = 27$.

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