# Measures of Central Tendency

Standard difficulty · 20 questions · 40 marks · Time: 38 minutes

Name: _____ Date: _____ Score: ____ / 40

Write full answers in Sections B and C. Answers are on the last page — try every question first!

## Section A — Choose the correct answer — 8 × 1 = 8 marks

**1.** The sum of observations divided by their number is the:

**(a)** mode **(b)** range
**(c)** median **(d)** arithmetic mean

**2.** Find the arithmetic mean of 86, 89, 81, 63, 83, 84.

**(a)** 81 **(b)** 82 **(c)** 486 **(d)** 89

**3.** Find the median of 10, 88, 20, 24, 46, 22, 67.

**(a)** 49 **(b)** 39.57 **(c)** 25 **(d)** 24

**4.** What is the mode of 30, 53, 26, 53, 53, 30, 32, 35, 23?

**(a)** 32 **(b)** 53 **(c)** 30 **(d)** 26

**5.** Find the mean of this discrete series.
Value (X): 100, 120, 140, 160, 180
Frequency (f): 6, 2, 15, 13, 7

**(a)** 146.05 **(b)** 1,256 **(c)** 140 **(d)** 148.05

**6.** The mean of 4 observations is 75. 3 of them are 61, 84, 80. What is the missing observation?

**(a)** 79 **(b)** 300 **(c)** 76 **(d)** 75

**7.** A student scores 65, 98 and 73 in three tests carrying weights 3, 4, 5. What is the weighted mean mark?

**(a)** 78.67 **(b)** 79.33 **(c)** 82.33 **(d)** 317.33

**8.** In ordered data of 43 items, the median is the size of which item?

**(a)** 23th **(b)** 10.75th **(c)** 22th **(d)** 21.5th

## Section B — Short answer — 8 × 2 = 16 marks

**9.** What is a measure of central tendency?

**10.** Find the mean of 65, 59, 47, 50, 29 by the assumed mean method, taking A = 60. Show Σd.

**11.** Find the median of this distribution.
Class: 30–35, 35–40, 40–45, 45–50, 50–55
Frequency: 30, 5, 22, 24, 16

**12.** Find the mode of this distribution.
Class: 40–60, 60–80, 80–100, 100–120, 120–140
Frequency: 19, 27, 22, 18, 24

**13.** Find the median of this discrete series.
Value: 40, 50, 60, 70, 80
Frequency: 8, 5, 6, 15, 6

**14.** Find Q3 of 14, 29, 68, 72, 76, 86, 93 (already in order).

**15.** Find the mean of this distribution by the direct method (use class marks).
Class: 20–30, 30–40, 40–50, 50–60, 60–70
Frequency: 24, 17, 16, 18, 26

**16.** A candidate is at the 86th percentile among 116,000 candidates. About how many scored above the candidate, and what share is that?

## Section C — Longer answers — 4 × 4 = 16 marks

**17.** Compare the mean, median and mode.

**18.** Daily wages of workers are given below. (a) Find the mean wage (use class marks). (b) Find the median wage. (c) Which is higher here?
Daily wage (₹): 100–120, 120–140, 140–160, 160–180, 180–200
Workers: 3, 28, 11, 12, 16

**19.** Find the mean of this distribution by the step deviation method, taking A = 55 and c = 10. Show Σfd′.
Class: 30–40, 40–50, 50–60, 60–70, 70–80
Frequency: 24, 24, 27, 18, 10

**20.** Five families earn ₹13,000, ₹8,500, ₹12,500, ₹13,500, ₹100,000 a month. (a) Find the mean. (b) Find the median. (c) Which better shows a typical family's income, and why?

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# Answer key

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| Q | Answer | Working |
|---|---|---|
| 1 | **(d) arithmetic mean** | — |
| 2 | **(a) 81** | 486 ÷ 6 = 81 |
| 3 | **(d) 24** | in order: 10, 20, 22, 24, 46, 67, 88; the middle value |
| 4 | **(b) 53** | 53 occurs 3 times, more than any other value |
| 5 | **(a) 146.05** | Σfx ÷ Σf = 6,280 ÷ 43 |
| 6 | **(d) 75** | 4 × 75 − 225 = 75 |
| 7 | **(b) 79.33** | (65 × 3 + 98 × 4 + 73 × 5) ÷ 12 |
| 8 | **(c) 22th** | (N + 1) ÷ 2 with N = 43 |
| 9 | **A single value that represents a whole set of data, such as the mean, median or mode.** | — |
| 10 | **Σd = −50; mean = 50** | d = X − 60; mean = 60 + Σd ÷ 5 |
| 11 | **43.07** | N ÷ 2 = 48.5; median class 40–45: L = 40, c.f. = 35, f = 22, h = 5 |
| 12 | **72.31** | modal class 60–80: L = 60, D1 = 8, D2 = 5, h = 20; L + D1 ÷ (D1 + D2) × h |
| 13 | **70** | (N + 1) ÷ 2 = 20.5; cumulative frequencies 8, 13, 19, 34, 40 |
| 14 | **86** | 3(N + 1) ÷ 4 = 6th item: item 6 |
| 15 | **45.50** | Σfm ÷ Σf = 4,595 ÷ 101 |
| 16 | **about 16,240, 14%** | (100 − 86)% of 116,000 |
| 17 | **The mean uses all values but is pulled by extremes; the median is the middle value and resists extremes; the mode is the most frequent value and suits the most typical size or choice.** | — |
| 18 | **(a) ₹152.86 (b) ₹147.27 (c) the mean** | mean = Σfm ÷ Σf; median = L + ((N ÷ 2 − c.f.) ÷ f) × h |
| 19 | **Σfd′ = −34; mean = 51.70** | d′ = (m − 55) ÷ 10; mean = A + (Σfd′ ÷ Σf) × c |
| 20 | **(a) ₹29,500 (b) ₹13,000 (c) the median, because the mean is pulled up by one very high income** | 147,500 ÷ 5; middle value in order |