# Statistics

Standard difficulty · 20 questions · 40 marks · Time: 36 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for 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 range of 41, 65, 66, 83, 14, 29 is:

**(a)** 69 **(b)** 83 **(c)** 70 **(d)** 49

**2.** The mean deviation about the mean of 15, 8, 1, 20, 3, 1 is:

**(a)** 158/3 **(b)** 38/3 **(c)** 19/3 **(d)** 8

**3.** The variance of 14, 15, 11, 8 is:

**(a)** 10 **(b)** 15 **(c)** 15/2 **(d)** 5/2

**4.** If the variance of a set of data is 36, its standard deviation is:

**(a)** 6 **(b)** 18 **(c)** 1296 **(d)** 12

**5.** The range of a set of data is:

**(a)** the most common value

**(b)** the middle value

**(c)** the average of all the values

**(d)** the largest value minus the smallest value

**6.** The mean deviation about the median of 18, 18, 10, 10, 15 is:

**(a)** 16/5 **(b)** 84/25 **(c)** 15 **(d)** 21/5

**7.** A set of data has standard deviation 2 (variance 4). If each observation is multiplied by 4, the new variance is:

**(a)** 4 **(b)** 16 **(c)** 64 **(d)** 32

**8.** Assertion (A): A data set with variance 121 has standard deviation 242.
Reason (R): The standard deviation is the positive square root of the variance.

**(a)** Both A and R are true, and R is the correct explanation of A.

**(b)** Both A and R are true, but R is not the correct explanation of A.

**(c)** A is true, but R is false.

**(d)** A is false, but R is true.

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

**9.** Find the mean deviation about the mean for the data: 29, 34, 40, 33, 27, 35.

**10.** Find the mean deviation about the median for the data: 28, 38, 32, 34, 35, 3, 38, 16.

**11.** Find the mean, variance and standard deviation of 2, 23, 17, 22, 4, 22.

**12.** Find the mean deviation about the mean: x: 20, 25, 30, 35, 40, 45; f: 3, 8, 4, 2, 11, 12. (Give answers to 2 decimal places where needed.)

**13.** Find the mean and variance: x: 16, 21, 26, 31, 36, 41; f: 9, 7, 11, 5, 9, 11. (Give answers to 2 decimal places where needed.)

**14.** Find the mean of the grouped data (class: frequency): 40–60: 8; 60–80: 5; 80–100: 6; 100–120: 15; 120–140: 6; 140–160: 2. (Give answers to 2 decimal places where needed.)

**15.** The data 3, 6, 16, 18, 17 have mean 12 and variance 194/5. Each observation is multiplied by 3 and then 4 is added. Find the new mean and new variance.

**16.** Find the mean and variance of the first 13 natural numbers.

## Section C — Word problems — 4 × 4 = 16 marks

**17.** Find the mean deviation about the mean for the grouped data (class: frequency): 30–50: 14; 50–70: 8; 70–90: 10; 90–110: 12; 110–130: 2; 130–150: 15. (Give answers to 2 decimal places where needed.)

**18.** Find the mean, variance and standard deviation of the grouped data (class: frequency): 20–40: 14; 40–60: 3; 60–80: 9; 80–100: 13; 100–120: 13; 120–140: 14. (Give answers to 2 decimal places where needed.)

**19.** The mean of 5 observations is 8 and their variance is 84/5. Three of them are 9, 5, 8. Find the other two.

**20.** The mean and standard deviation of 40 observations were found to be 40 and 3. Later it was found that one observation was read as 53 instead of 34. Find the correct mean and variance. (Give answers to 2 decimal places where needed.)

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# Answer key

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| Q | Answer | Working |
|---|---|---|
| 1 | **(a) 69** | largest − smallest |
| 2 | **(c) 19/3** | mean = 8; average of $\|x_i - 8\|$ |
| 3 | **(c) 15/2** | mean 12; average of squared deviations |
| 4 | **(a) 6** | SD = √variance |
| 5 | **(d) the largest value minus the smallest value** | — |
| 6 | **(a) 16/5** | median = 15 |
| 7 | **(c) 64** | variance × $k^2$, SD × k |
| 8 | **(d) A is false, but R is true.** | A is false: √121 = 11. R is true. |
| 9 | **10/3** | mean = 33; $\Sigma\|x_i - 33\| = 20$; ÷ 6 |
| 10 | **33/4** | median = 33; $\Sigma\|x_i - 33\| = 66$; ÷ 8 |
| 11 | **Mean 15; variance 76; SD √76 ≈ 8.72** | variance = $\Sigma(x_i - \bar{x})^2 \div n$ |
| 12 | **7.89** | mean = $\Sigma fx \div \Sigma f = 143/4$; MD = $\Sigma f\|x - \bar{x}\| \div \Sigma f$ |
| 13 | **Mean 28.98; variance 79.10** | variance = $\Sigma f(x - \bar{x})^2 \div \Sigma f$ |
| 14 | **670/7** | class marks 50, 70, 90, 110, 130, 150; $\Sigma fx \div \Sigma f$ |
| 15 | **Mean 40; variance 1746/5** | mean → k × mean + a; variance → $k^2$ × variance |
| 16 | **Mean 7; variance 14** | mean (n + 1)/2; variance $(n^2 - 1)/12$ |
| 17 | **32.21** | class marks 40, 60, 80, 100, 120, 140; mean 88.20 |
| 18 | **Mean 85.15; variance 1,285.58; SD 35.86** | class marks 30, 50, 70, 90, 110, 130 |
| 19 | **3 and 15** | $x + y = 18$ and $x^2 + y^2 = 234$ |
| 20 | **Mean 39.53; variance 5.45** | $\Sigma x = 40 \times 40 - 53 + 34$; $\Sigma x^2 = 40(3^2 + 40^2) - 53^2 + 34^2$ |



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