GCSE Mathematics

Averages from Raw Data

Worked Solutions

Pearson Edexcel GCSE & iGCSE Mathematics

Section A — Foundation — Worked Solutions

[Fluency] Question 1

Sorted: 2, 3, 4, 7, 9

$$\text{Mean} = \frac{4+7+2+9+3}{5} = \frac{25}{5} = 5$$

Median = 3rd value = 4 Mode = none Range = 9–2 = 7

∴ **Mean=5, Median=4, Mode=none, Range=7**

[Fluency] Question 2

Sorted: 1,2,3,5,7,8,9. 4th value.

∴ **Median = 5**

[Fluency] Question 3

3 appears 3 times.

∴ **Mode = 3**

[Fluency] Question 4

18 – 3

∴ **Range = 15**

[Fluency] Question 5

$$\frac{15+18+22+19+16}{5} = \frac{90}{5}$$

∴ **Mean = 18**

[Reasoning] Question 6

Mean=(2+2+2+3+100)/5=109/5=21.8. Median=2. Mode=2.

(b) The mean is distorted by the outlier 100. The median or mode (both 2) better represent the typical value.

∴ **(a) Mean=21.8, Median=2, Mode=2 (b) Median or mode**

[Reasoning] Question 7

Sum = 8×6 = 48. Known sum = 6+10+7+9+5 = 37. Missing = 48–37

∴ **Missing = 11**

[Reasoning] Question 8

$$\text{Mean} = \frac{155 + 162 + 148 + 171 + 159}{5} = \frac{795}{5} = 159$$

Range = 171–148 = 23

∴ **Mean = 159 cm, Range = 23 cm**

[Problem Solving] Question 9

$$\text{Total after 6 tests} = 74 \times 6 = 444$$

$$\text{Total after 5 tests} = 72 \times 5 = 360$$

6th score = 444 – 360

∴ **6th test score = 84**

[Problem Solving] Question 10

(a) Continuous (b) Discrete (c) Discrete (d) Categorical

∴ **(a) Continuous (b) Discrete (c) Discrete (d) Categorical**

Section B — Higher — Worked Solutions

[Fluency] Question 1

$\frac{5x+20}{5} = 15 \Rightarrow 5x = 55 \Rightarrow x = 11$

∴ **x=11; values: 11, 13, 15, 17, 19**

[Fluency] Question 2

$\text{Median} = \frac{7+9}{2} = 8$

∴ **Median = 8**

[Fluency] Question 3

$\bar{x} = \frac{15 \times 8 + 20}{9} = \frac{140}{9}$

∴

[Reasoning] Question 4

$0.6 \times 68 + 0.4 \times 72 = 40.8 + 28.8$

∴ **Weighted mean = 69.6**

[Reasoning] Question 5

$\text{New mean} = \frac{nm - v}{n-1}$

∴

[Reasoning] Question 6

Primary: data collected by the researcher themselves (e.g. questionnaire, experiment). Advantage: tailored to the specific question.

Secondary: data from an existing source (e.g. government statistics, internet). Advantage: cheaper and faster to obtain.

∴ **Primary = collected firsthand; Secondary = pre-existing data**

[Reasoning] Question 7

$$\text{Mean} = \frac{3+5+7+9+51}{5} = \frac{75}{5} = 15$$

Median = 7 Mode = none

(b) The mean is most affected — the outlier 51 pulls it up to 15, far above the other values.

∴ **(a) Mean=15, Median=7 (b) Mean most affected**

[Problem Solving] Question 8

$$\bar{x} = \frac{20 \times 65 + 30 \times 72}{50} = \frac{1300 + 2160}{50} = \frac{3460}{50}$$

∴ **Combined mean = 69.2**

[Problem Solving] Question 9

Need mean=10→sum=50, median=9 (3rd of 5), mode=7 (appears most).

Try: 7, 7, 9, 12, 15 → sum=50 ✓, median=9 ✓, mode=7 ✓

∴ **7, 7, 9, 12, 15 (or equivalent valid set)**

[Problem Solving] Question 10

Total sum of group 1 = n■x■■. Total sum of group 2 = n■x■■.

Combined sum = n■x■■ + n■x■■. Combined n = n■+n■.

$$\bar{x} = \frac{\text{combined sum}}{\text{combined } n} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2}{n_1 + n_2}$$ ✓

∴ **Proved ✓**