

Averages and the Range

GCSE Mathematics • Foundation Tier • Grades 2–3 • Non-calculator

WORKED SOLUTIONS

Name: _____ *worked example* _____

Class: _____

Total: _____ *45* _____ / 45

Show all your working. Marks are given for correct method as well as the final answer.

1. Work out the mean of 4, 7, 9, 12. [2 marks]

$$4 + 7 + 9 + 12 = 32$$

$$32 \div 4 = 8$$

Answer: _____ *8* _____

2. Work out the median of 3, 8, 5, 9, 4. [2 marks]

order: 3, 4, 5, 8, 9

ORDER them first!

middle = 5

Answer: _____ *5* _____

3. Write down the mode of 2, 5, 5, 7, 9, 5. [1 mark]

5 appears three times

Answer: _____ *5* _____

4. Work out the range of 12, 4, 19, 7. [2 marks]

$$19 - 4 = 15$$

range is a SPREAD, not an average

Answer: _____ *15* _____

5. Work out the median of 6, 2, 9, 4. [2 marks]

order: 2, 4, 6, 9

two middles: 4 and 6

$$(4 + 6) \div 2 = 5$$

Answer: _____ *5* _____

6. Write down the mode of 3, 6, 3, 8, 6, 1. [2 marks]

both appear twice

two modes is allowed

Answer: _____ *3 and 6* _____

7. Explain why the list 2, 4, 6, 8 has no mode. [1 mark]

every value appears once

Answer: _____ *no value repeats* _____

8. Work out the mean of 15, 22, 18, 25, 20. [2 marks]

$$\text{total} = 100$$

$$100 \div 5 = 20$$

Answer: _____ *20* _____

9. Five numbers have a mean of 12. Work out their total. [2 marks]

$$\text{total} = \text{mean} \times \text{how many}$$

$$12 \times 5 = 60$$

Answer: _____ 60 _____

10. Four numbers have a mean of 9. Three of them are 7, 11 and 6. Work out the fourth. [3 marks]

$$\text{total} = 9 \times 4 = 36$$

$$7 + 11 + 6 = 24$$

$$36 - 24 = 12$$

Answer: _____ 12 _____

11. The mean of 5 numbers is 8. A sixth number, 20, is added. Work out the new mean. [3 marks]

$$\text{old total} = 40$$

$$\text{new total} = 60$$

$$60 \div 6 = 10$$

Answer: _____ 10 _____

12. A set of numbers has mean 15 and one value is removed, leaving 4 numbers with total 52. The original set had 5 numbers. Work out the value removed. [3 marks]

$$\text{original total} = 15 \times 5 = 75$$

$$75 - 52 = 23$$

Answer: _____ 23 _____

13. The table shows goals scored in 20 matches. Write down the modal number of goals. [1 mark]

Goals	Frequency
0	4
1	7
2	6
3	3

highest frequency is 7
that row is 1 goal

Answer: _____ 1 goal _____

14. Using the same table, work out the total number of goals scored. [2 marks]

$$0 \times 4 = 0 \quad 1 \times 7 = 7$$

$$2 \times 6 = 12 \quad 3 \times 3 = 9$$

$$0 + 7 + 12 + 9 = 28$$

Answer: _____ 28 _____

15. Using the same table, work out the mean number of goals to 1 decimal place. [3 marks]

$$\text{total goals } 28, \text{ total matches } 20$$

$$28 \div 20 = 1.4$$

Answer: _____ 1.4 _____

16. Using the same table, work out the median number of goals. [3 marks]

20 values, so between the 10th and 11th
first 4 are 0, next 7 are 1 → 5th to 11th are 1
both middles are 1

Answer: _____ 1 goal _____

17. The grouped table shows heights. Write down the modal class.

[1 mark]

Height h cm	Frequency
$140 < h \leq 150$	5
$150 < h \leq 160$	9
$160 < h \leq 170$	6

biggest frequency is 9

Answer: $150 < h \leq 160$

18. Using the grouped table, estimate the mean height.

[4 marks]

midpoints: 145, 155, 165

$$145 \times 5 = 725$$

$$155 \times 9 = 1395$$

$$165 \times 6 = 990$$

$$\text{total } 3110 \div 20 = 155.5$$

Answer: 155.5 cm

19. Explain why the mean from a grouped table is only an estimate.

[2 marks]

*we only know which class each value is in
midpoints are an assumption*

Answer: *exact values are unknown*

20. Two classes sat the same test. Class A: mean 62, range 30. Class B: mean 58, range 12.

(a) Which class did better on average? Explain.

[2 marks]

A, because its mean is higher

$$62 > 58$$

(b) Which class was more consistent? Explain.

[2 marks]

B, because its range is smaller

smaller range = more consistent

Answer: *A on average ; B more consistent*