# 4.18 Averages from Frequency Tables: 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

**Answer ALL questions. Show all your working.**

**1** A hockey team's coach recorded the number of goals scored in each of 15 matches. The table shows the results.

Goals scored (x): 0, 1, 2, 3, 4
Frequency (f): 2, 5, 4, 3, 1
Total number of matches = 15

Write down the range of the number of goals scored.

**(Total for Question 1 is 1 mark)**

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**2** The table shows information about number of pets for a group of people.
Number of pets: 0, 1, 2, 3, 4, 5
Frequency: 3, 3, 11, 7, 9, 9
Work out the mode and the range.

**(Total for Question 2 is 2 marks)**


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**3** The grouped frequency table shows the results of a survey (Mass in kg).

$0 < x \leq 10$: 6

$10 < x \leq 20$: 9

$20 < x \leq 30$: 16

$30 < x \leq 40$: 17

Work out an estimate for the mean. Give your answer correct to 1 decimal place.

**(Total for Question 3 is 4 marks)**

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**4** The table shows information about number of pets for a group of people.

Number of pets: 0, 1, 2, 3, 4, 5

Frequency: 7, 2, 2, 4, 14, 6

Work out the median.

**(Total for Question 4 is 3 marks)**

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**5** The table shows information about number of goals scored for a group of people.

Number of goals scored: 0, 1, 2, 3, 4

Frequency: 14, 2, 11, 9, 9

Work out the total goals scored for the whole group.

**(Total for Question 5 is 2 marks)**


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**6** The table shows information about shoe size for a group of people.
Shoe size: 3, 4, 5, 6, 7
Frequency: 8, 7, 6, 9, 4
Work out the mode and the range.

**(Total for Question 6 is 2 marks)**

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**7** A hockey team's coach recorded the number of goals the team scored in each of 20 matches last season. The frequency table shows the results.

| Goals scored, x | Frequency, f |
|---|---|
| 0 | 2 |
| 1 | 7 |
| 2 | 4 |
| 3 | 5 |
| 4 | 2 |
| **Total** | **20** |

**(a)** Write down the mode. **(1)**

.....

**(b)** Find the median number of goals scored. **(2)**

.....

**(c)** Calculate the mean number of goals scored per match. Give your answer correct to 2 decimal places. **(3)**

.....

**(Total for Question 7 is 6 marks)**


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**8** A researcher asked 25 students how many text messages each of them sent during a one hour period. The frequency table shows the results. Calculate the mean number of text messages sent.

Number of text messages sent in one hour (25 students)

| Number of texts (x) | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Frequency (f) | 2 | 4 | 6 | 7 | 4 | 2 |

Total number of students = 25

**(Total for Question 8 is 3 marks)**

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**9** A competition weighed 60 fish and recorded their length, l cm, in a grouped frequency table. Two of the frequencies are given in terms of n.

Length, l (cm): $0 < l \leq 20$, $20 < l \leq 40$, $40 < l \leq 60$, $60 < l \leq 80$
Frequency (f): n, 3n, 18, 2n
Total number of fish = 60

**(a)** Find the value of n. **(2)**

.....

**(b)** Using your value of n, calculate an estimate for the mean length of the fish. **(4)**

.....

**(Total for Question 9 is 6 marks)**


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**10** Callum recorded the number of text messages sent by 17 students during one evening. The table shows the results.

Messages sent (x): 0, 1, 2, 3, 4, 5
Frequency (f): 1, 3, 5, 4, 3, 1
Total number of students = 17

Find the median number of messages sent.

**(Total for Question 10 is 2 marks)**

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**11** A teacher records the scores out of 10 for 18 pupils. The frequency table is:
Score: 2, 4, 6, 8
Frequency: 2, 6, 7, 3

**(a)** Work out the mean score. Give your answer to 2 decimal places. **(4)**

**(b)** State the mode score. **(2)**

**(Total for Question 11 is 6 marks)**


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**12** Some pupils were asked how many siblings they have, but the table has been damaged and one frequency, a, is unknown.

Number of siblings (x): 0, 1, 2, 3
Frequency (f): 2, 4, a, 1

Given that the mean number of siblings is 1.3, find the value of a. You must show your working.

**(Total for Question 12 is 4 marks)**

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**13** Use the table to calculate the variance of the data (population variance), giving your answer correct to 3 decimal places.
Value: 1, 3, 5
Frequency: 4, 3, 3
Show all working.

**(Total for Question 13 is 9 marks)**


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# Mark scheme · 4.18 Averages from Frequency Tables: 1-hour Pack

## Question 1

| | |
|---|---|
| 4 cao | **B1** |

**Answer: 4**

## Question 2

| | |
|---|---|
| mode 2 | **B1** |
| range 5 | **B1** |

**Answer: mode = 2, range = 5**

## Question 3

| | |
|---|---|
| midpoints of the classes | **M1** |
| midpoint x frequency | **M1** |
| sum 1160 divided by 48 | **M1** |
| 24.2 | **A1** |

**Answer: 24.2**

## Question 4

| | |
|---|---|
| total frequency 35 | **M1** |
| median position 18 | **M1** |
| 4 | **A1** |

**Answer: 4**

## Question 5

| | |
|---|---|
| f x value for each column | **M1** |
| 87 | **A1** |

**Answer: 87**

## Question 6

| | |
|---|---|
| mode 6 | **B1** |
| range 4 | **B1** |

**Answer: mode = 6, range = 4**

## Question 7

| | |
|---|---|
| (a) 1 cao | **B1** |

**(a) Answer: 1**

| | |
|---|---|
| (b) correct cumulative frequencies used to locate the 10th and 11th values (2, 9, 13, 18, 20) oe | **M1** |
| (b) 2 cao | **A1** |

**(b) Answer: 2**

| | |
|---|---|
| (c) at least 4 correct values of f x x, or sight of sum(fx) = 38 | **M1** |
| (c) 38 / 20 (dependent on previous M1) | **M1** |
| (c) 1.9 cao | **A1** |

**(c) Answer: 1.9**

## Question 8

| | |
|---|---|
| at least 5 correct values of f x x, or sight of sum(fx) = 63 | **M1** |
| 63 / 25 (dependent on previous M1) | **M1** |
| 2.52 cao | **A1** |

**Answer: 2.52**

## Question 9

| | |
|---|---|
| (a) n + 3n + 18 + 2n = 60 leading to 6n + 18 = 60 oe | **M1** |
| (a) 7 cao | **A1** |

**(a) Answer: n = 7**

| | |
|---|---|
| (b) ft correct midpoints identified: 10, 30, 50, 70 | **M1** |
| (b) ft correct frequencies from part (a): 7, 21, 18, 14 | **M1** |
| (b) ft sum(fx) = 10(7) + 30(21) + 50(18) + 70(14) = 2580 oe | **M1** |
| (b) ft 43 cao | **A1** |

**(b) Answer: 43 cm**

## Question 10

| | |
|---|---|
| correct use of cumulative frequencies to find the 9th value (1, 4, 9, 13, 16, 17) oe | **M1** |
| 2 cao | **A1** |

**Answer: 2**

## Question 11

| | |
|---|---|
| (a) correct method: sum of score*frequency, e.g. 2*2 + 4*6 + 6*7 + 8*3 | **M1** |
| (a) correct total: 4 + 24 + 42 + 24 = 94 | **M1** |
| (a) divide by 18: 94 / 18 | **M1** |
| (a) 5.22 awrt | **A1** |

**(a) Answer: 5.22 (total 94; mean = 94/18 = 5.222... rounded to 2 dp = 5.22).**

| | |
|---|---|
| (b) identify mode as 6 (highest frequency 7) oe | **B1** |
| (b) 6 cao | **A1** |

**(b) Answer: Mode: 6 (frequency 7 is highest).**

## Question 12

| | |
|---|---|
| sum(fx) = 4 + 2a + 3 (= 7 + 2a) oe | **M1** |
| sum(f) = 7 + a oe | **M1** |
| (7 + 2a) / (7 + a) = 1.3 leading to 7 + 2a = 9.1 + 1.3a, dependent on both previous M marks | **dM1** |
| 3 cao | **A1** |

**Answer: a = 3**

## Question 13

| | |
|---|---|
| calculate total frequency and mean: f total = 10, mean xbar = (1*4 + 3*3 + 5*3)/10 = 28/10 = 2.8 | **M1** |
| calculate $x^2$ * f for each value: $1^2$*4 = 4, $3^2$*3 = 27, $5^2$*3 = 75 | **M1** |
| sum $x^2$ f = 4 + 27 + 75 = 106 | **M1** |
| calculate E($x^2$) = 106 / 10 = 10.6 | **M1** |
| calculate mean$^2$ = $(2.8)^2$ = 7.84 | **M1** |
| calculate variance = E($x^2$) - mean$^2$ = 10.6 - 7.84 | **M1** |
| variance = 2.76 (exact to 2 dp) | **A1** |
| variance = 2.760 (to 3 dp) cao | **A1** |
| clear method and correct final answer with workings shown | **B1** |

**Answer: 2.760 (to 3 dp)**


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