Name ANSWERS	Class

MATHS TEACHER HUB

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Averages from tables

(9 – 1) Topic booklet

Foundation

These questions have been collated from previous years GCSE Mathematics papers.

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.	Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**
- If the question is a **1F** question you are not allowed to use a calculator.
- If the question is a **2F** or a **3F** question, you may use a calculator to help you answer.

Information

- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL questions
Write your answers in the space provided.
You must write down all the stages in your working.

8 Rachel carried out a survey of 10 people to find out the type of fruit they like best.

The table gives information about her results.

Type of fruit	Number of people
apple	2
banana	5
orange	3

(a) Which type of fruit is the mode?

Banana

(1)

In Rachel's survey, 2 out of 10 people like apples best.

(b) Write 2 out of 10 as a percentage.

$\frac{2}{10}$

20 %

(1)

(Total for Question 8 is 2 marks)

9 The table shows the number of books read by four people in one month.

Person	Number of books
Ximena	7
Martha	9
Kezia	1
Tabby	5

(a) Work out the median number of books.

1 5 7 9
↑

6

(2)

(b) Find the range.

9 − 1 = 8

8

(1)

(Total for Question 9 is 3 marks)

11 The table shows information about the weights of the people in a hotel lift.

Weight		Number of people	
40 kg	×	1	= 40
50 kg	×	2	= 100
60 kg	×	4	= 240
70 kg	×	5	= 350
80 kg	×	3	= 240
90 kg	×	1	= 90
			1060

Show that the total weight of the people in the lift is less than 1200 kg.

$1060 < 1200$

(Total for Question 11 is 3 marks)

15 The table shows information about the number of social media accounts used by each of 300 students.

Number of social media accounts		Frequency	
0	x	3	= 0
1	x	57	= 57
2	x	84	= 168
3	x	75	= 225
4	x	81	= 324
			774

(a) Work out the total number of social media accounts used by these students.

774

(2)

(b) Find the median number of social media accounts used by these students.

$\frac{300}{2}$ = 150th student

3

(2)

(Total for Question 15 is 4 marks)

15 The table shows information about the ages of all the people at a party.

Age (years)	Frequency
11 – 20	6
21 – 30	16
31 – 40	10
41 – 50	8

(a) Work out the total number of these people who were aged 40 or less.

32

(1)

Andy says that the range of ages is 39 years because 50 – 11 = 39

(b) The range may not be 39 years.
Explain why.

We dont know if anyone is aged 50 or 11
So the range could be less than 39

(1)

(Total for Question 15 is 2 marks)

16 The table gives information about the number of points scored by each of 16 students in a game.

Number of points	Frequency
0	1
1	3
2	5
3	4
4	3

Tina worked out the median of the number of points scored to be 5

(a) Explain why it is **not** possible for the median to be 5

None of the students scored 5 points

(1)

Tina also worked out the total number of points scored by the 16 students in the game.
Here is her working.

$$(0 \times 1) + (1 \times 3) + (2 \times 5) + (3 \times 4) + (4 \times 3) = 1 + 3 + 10 + 12 + 12 = 38$$

Tina made a mistake in her working to find the total number of points scored.

(b) Describe the mistake that Tina made.

0 x 1 = 0 not 1

(1)

(Total for Question 16 is 2 marks)

16 Marla buys some bags of buttons.

There are 19 buttons or 20 buttons or 21 buttons or 22 buttons in each bag.

The table gives some information about the number of buttons in each bag.

Number of buttons	Frequency	
19	5	95
20	7	=140
21	3	= 63
22	1	=22
		320

The total number of buttons is 320

Complete the table.

95 ÷ 19 = 5

(Total for Question 16 is 3 marks)

16 Ross rolled an ordinary dice 30 times.

The frequency table gives information about his results.

Score	Frequency
1	7
2	5
3	4
4	4
5	6
6	4

Ross worked out the mean score as 8

(a) Explain why it is impossible for the mean score to be 8

lowest was 1, and the highest was 6, You cannot get an average higher than the largest value.

(1)

Graham also worked out the mean score.

Here is his working.

$1 \times 7 + 2 \times 5 + 3 \times 4 + 4 \times 4 + 5 \times 6 + 6 \times 4 = 99$

$99 \div 6 = 16.5$

The mean score is 16.5

(b) Describe the mistake Graham made in his method to work out the mean score.

He divided by 6 groups rather than 30 rolls.

(1)

(Total for Question 16 is 2 marks)

17 The table shows information about the heights of 80 teenagers.

Height (h cm)		Frequency	
$150 < h \leqslant 160$ (155)	×	8	= 1240
$160 < h \leqslant 170$ (165)	×	14	= 2310
$170 < h \leqslant 180$ (175)	×	24	= 4200
$180 < h \leqslant 190$ (185)	×	30	= 5550
$190 < h \leqslant 200$ (195)		4	= 780
			14080

Work out an estimate for the mean height of the teenagers.

Estimated mean = $\frac{14080}{80}$ = 176

176 cm

November 2022 – 2F

(Total for Question 17 is 3 marks)

17 The table shows some information about the dress sizes of 25 women.

Dress size	Number of women	
8	2	2
10	9	11
12	8	19 ← 13th woman in this group
14	6	

Find the median dress size.

$\frac{25}{2}$ = 12.5

= 13th woman

12

(1)

June 2017 – Paper 3F

(Total for Question 17 is 1 mark)

18 The incomplete table gives some information about the lengths of the planks of wood in Ben's workshop.

Length of plank (metres)		Number of planks	
3	×	5	= 15
2.5	×	8	= 20
2		13	= 26
1.5	×	14	= 21
1	×	10	= 10
			92

The total length of these planks is 92 metres.

Work out the number of planks of length 2 metres in Ben's workshop.

92 − 66 = 26

26 ÷ 2 = 13

13

.....

(Total for Question 18 is 3 marks)

18 The table shows information about the numbers of points scored by 30 students in a quiz.

Number of points		Frequency	
0	x	4	= 0
1	x	3	= 3
2	x	7	= 14
3	x	5	= 15
4	x	6	= 24
5	x	5	= 25
			81

(a) Find the modal number of points.

2

(1)

(b) Work out the total number of points scored.

81

(2)

(Total for Question 18 is 3 marks)

19 The table shows information about the heights of 80 children.

Height (h cm)	Frequency	
$130 < h \leqslant 140$	4	4
$140 < h \leqslant 150$	11	15
$150 < h \leqslant 160$	24	39
$160 < h \leqslant 170$	22	61 ← 40th child is in this group
$170 < h \leqslant 180$	19	
		80

Find the class interval that contains the median.

$\frac{80}{2} = 40^{th}$ child

$160 < h \leq 170$

(1)

(Total for Question 19 is 1 mark)

22 Seija works at a weather station.
The table gives information about the temperature, T °C, at midday for each of 50 cities in the UK on Tuesday.

Temperature (T °C)		Frequency	
$10 < T \leqslant 15$ (12.5)	×	2	= 25
$15 < T \leqslant 20$ (17.5)	×	8	= 140
$20 < T \leqslant 25$ (22.5)	×	13	= 292.5
$25 < T \leqslant 30$ (27.5)	×	21	= 577.5
$30 < T \leqslant 35$ (32.5)	×	6	= 195
			1230

(a) Calculate an estimate for the mean temperature.

Estimated mean = $\frac{1230}{50} = 24.6$

24.6 °C

(3)

Seija says,

> "The median temperature is 22.5 °C because 22.5 is the middle number in the middle group."

(b) Is Seija correct?
Give a reason for your answer.

The 25th city is in the $25 < T \leqslant 30$ group.

(1)

(Total for Question 22 is 4 marks)

23 The grouped frequency table gives information about the heights of 30 students.

Height (h cm)	Frequency
$130 < h \leqslant 140$	1
$140 < h \leqslant 150$	7
$150 < h \leqslant 160$	8
$160 < h \leqslant 170$	10
$170 < h \leqslant 180$	4

Write down the modal class interval.

$160 < h \leqslant 170$

(1)

Specimen 1 – Paper 2F **(Total for Question 23 is 1 mark)**

24 Jenny works in a shop that sells belts.

The table shows information about the waist sizes of 50 customers who bought belts from the shop in May.

Belt size	Waist (w inches)		Frequency	
Small	$28 < \overset{30}{w} \leqslant 32$	×	24	= 720
Medium	$32 < \overset{34}{w} \leqslant 36$	×	12	= 408
Large	$36 < \overset{38}{w} \leqslant 40$	×	8	= 304
Extra Large	$40 < \overset{42}{w} \leqslant 44$	×	6	= 252
				1684

Calculate an estimate for the mean waist size.

Estimated mean $= \frac{1684}{50} = 33.68$

33.68 inches

(3)

Specimen 1 – Paper 3F **(Total for Question 24 is 3 marks)**

25 The table gives information about the times taken, in seconds, by 18 students to run a race.

Time (t seconds)		Frequency	
$5 < t \leqslant 10$ (7.5)	×	1	= 7.5
$10 < t \leqslant 15$ (12.5)	×	2	= 25
$15 < t \leqslant 20$ (17.5)	×	7	= 122.5
$20 < t \leqslant 25$ (22.5)	×	8	= 180
			335

Work out an estimate for the mean time.
Give your answer correct to 3 significant figures.

Estimated mean $= \frac{335}{18} = 18.61\dot{}$

18.6 seconds

(Total for Question 25 is 3 marks)

26 The table shows information about the heights of 80 plants.

Height (h cm)	Frequency	
$10 < h \leqslant 20$	7	7
$20 < h \leqslant 30$	13	20
$30 < h \leqslant 40$	14	34
$40 < h \leqslant 50$	12	46
$50 < h \leqslant 60$	16	
$60 < h \leqslant 70$	18	

← 40th plant is in this group

(a) Find the class interval that contains the median.

40th plant

$40 < h \leq 50$

(1)

(Total for Question 26 is 1 mark)

27 The table shows information about the weekly earnings of 20 people who work in a shop.

Weekly earnings (£x)		Frequency	
$150 < x \leqslant 250$ (200)	×	1	= 200
$250 < x \leqslant 350$ (300)	×	11	= 330
$350 < x \leqslant 450$ (400)	×	5	= 2000
$450 < x \leqslant 550$ (500)	×	0	= 0
$550 < x \leqslant 650$ (600)	×	3	= 1800
			4330

(a) Work out an estimate for the mean of the weekly earnings.

Estimated mean = $\frac{4330}{20}$ = 216·50

£ 216·50

(3)

Nadiya says,

"The mean may **not** be the best average to use to represent this information."

(b) Do you agree with Nadiya?
You must justify your answer.

There are 3 people earning a lot more than the others, which will distort the mean. The median may be a better average.

(1)

November 2017 – Paper 1F **(Total for Question 27 is 4 marks)**

27 The table shows some information about the foot lengths of 40 adults.

Foot length (f cm)		Number of adults	
$16 \leqslant f < 18$	x	3	= 51
$18 \leqslant f < 20$	x	6	= 114
$20 \leqslant f < 22$	x	10	= 210
$22 \leqslant f < 24$	x	12	= 276
$24 \leqslant f < 26$	x	9	= 225
			876

(a) Write down the modal class interval.

$22 \leqslant f < 24$

(1)

(b) Calculate an estimate for the mean foot length.

Estimated mean = $\frac{876}{40}$ = 21.9

21.9 cm

(3)

(Total for Question 27 is 4 marks)

28 The table shows information about the weights of 120 oranges.

Weight (w grams)		Frequency	
$50 < w \leqslant 100$	75 ×	34	= 2550
$100 < w \leqslant 150$	125 ×	29	= 4875
$150 < w \leqslant 200$	175 ×	27	= 4725
$200 < w \leqslant 250$	225 ×	19	= 4275
$250 < w \leqslant 300$	×	11	= 3025
			19450

(a) Find the class interval that contains the median.

60th orange =

$100 < w \leqslant 150$

(1)

(b) Calculate an estimate for the mean weight of the 120 oranges.
Give your answer correct to 3 significant figures.

Estimated mean = $\frac{19450}{120} = 162.08\dot{3}$

162 grams

(3)

(Total for Question 28 is 4 marks)