Averages (H & F)

A collection of 9-1 Maths GCSE Sample and Specimen questions from AQA, OCR, Pearson-Edexcel and WJEC Eduqas.

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Total Marks:	

1. (a) When visiting a hat shop, each customer had the circumference of their head measured.

The table shows the results for the customers who bought a hat during December.

Head circumference, c (cm)		Number of customers	
$50 \leq c < 54$	52 $\times$	12	624
$54 \leq c < 58$	56 $\times$	32	1792
$58 \leq c < 62$	60 $\times$	14	840
$62 \leq c < 66$	64 $\times$	2	128
		60	

Calculate an estimate for the mean head circumference.

$$624 + 1792 + 840 + 128 = 3384$$

$$3384 \div 60 = 56.4 cm$$

[4]

(b) The hat shop sells 4 different sizes of hats.

The conversion table from head circumference to hat size is shown below

Head circumference, c (cm)	Hat size	
$50 \leq c < 54$	1	12
$54 \leq c < 58$	2	32
$58 \leq c < 62$	3	14
$62 \leq c < 66$	4	2

A salesman places an order for new stock for the hat shop.

The salesman's order form shows that about half of the hats ordered are size 2.

The owner of the shop says the order should show that about a quarter of the hats ordered are size 2.

Who is more likely to be correct, the salesman or the owner of the shop?

You must give a reason for your answer.

salesman   owner
"about ½"   "about ¼"

The salesman is correct : $\frac{32}{60}$ is closer to $\frac{1}{2}$ $\left(\frac{30}{60}\right)$ than

$\frac{1}{4}$ $\left(\frac{15}{60}\right)$

[2]

3. A prime number between 300 and 450 is chosen at random.

The table shows the probability that the number lies in different ranges.

Prime number, n	Probability
$300 \leqslant n < 330$	0.16 →4
$330 \leqslant n < 360$	0.24
$360 \leqslant n < 390$	✗ 0.2
$390 \leqslant n < 420$	0.16
$420 \leqslant n < 450$	0.24

(a) Work out the value of x.

$0.16 + 0.24 + 0.16 + 0.24 = 0.80$

$1 - 0.8 = 0.2$

[2]

(b) Work out the probability that the prime number is greater than 390

P(greater than 390) $= 0.16 + 0.24 = 0.40$

[1]

(c) There are four prime numbers between 300 and 330

How many prime numbers are there between 300 and 450?

÷4(0.16 → 4)÷4
×25(0.04 → 1)×25
       1 → 25

25

[2]

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

Foot length (*f* cm)		Number of adults	
$16 \leqslant f < 18$	17	3	=51
$18 \leqslant f < 20$	19	6	114
$20 \leqslant f < 22$	21	10	210
$22 \leqslant f < 24$	23	12	276
$24 \leqslant f < 26$	25	9	225

(a) Write down the modal class interval.

$22 \leq f < 24$ .... [1]

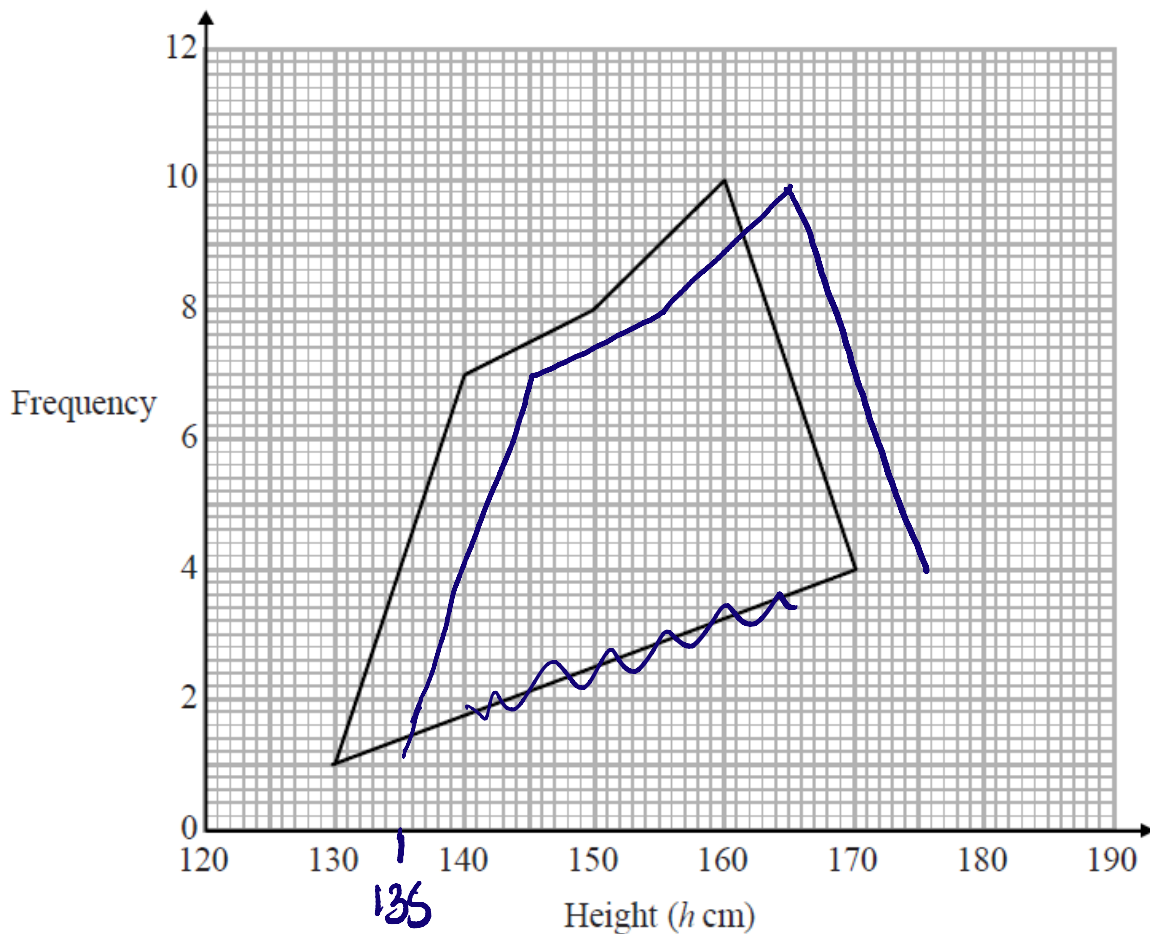(b) Calculate an estimate for the mean foot length.

$876 \div 40$

21.9 .... cm [3]

5. 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

(a) Write down the modal class interval.

$160 < h \leq 170$ .... [1]

This incorrect frequency polygon has been drawn for the information in the table.

135

(b) Write down two things wrong with this incorrect frequency polygon.

1 the end points should not be joined.

2 the mid points of each class interval should be plotted

[2]

6. 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	$28 < w \leqslant 32$	30	24	720
Medium	$32 < w \leqslant 36$	34	12	408
Large	$36 < w \leqslant 40$	38	8	304
Extra Large	$40 < w \leqslant 44$	42	6	252
			50	1684

a) Calculate an estimate for the mean waist size.

$1684 \div 50$

33.68

.........................33.68.........................inches [3]

Belts are made in sizes Small, Medium, Large and Extra Large.

Jenny needs to order more belts in June.

The modal size of belts sold is Small.

Jenny is going to order $\frac{3}{4}$ of the belts in size Small.

The manager of the shop tells Jenny she should not order so many Small belts.

b) Who is correct, Jenny or the manager?   Jenny $\frac{3}{4}$ Manager ↑

You must give a reason for your answer.

In May, just $\frac{1}{2}\left(\frac{24}{50}\right)$ small belts were sold. So the manager is right.

[2]

7. The times that 80 customers waited at a supermarket checkout are shown.

Time, t (minutes)	Frequency
$0 \leqslant t < 2$	32
$2 \leqslant t < 4$	19
$4 \leqslant t < 6$	20
$6 \leqslant t < 8$	7
$8 \leqslant t < 10$	2

80

(a) In which class interval is the median?   (40th)

Circle your answer.

[1]

$0 \leqslant t < 2$ （$2 \leqslant t < 4$） $4 \leqslant t < 6$ $6 \leqslant t < 8$

(b) The manager of the supermarket says,

"90% of our customers wait less than 6 minutes."

Does the data support this statement?   90% of 80 = 72 $\frac{71}{80}$ actually

You must show your working. wait less than 6 mins. ... so no the

data does not support this statement   [2]

8. Adam and six other men ran a race.

The times, in seconds, of the six other men are shown.

9.75 + 9.79 + 9.80 + 9.88 + 9.94 + 9.98 + __9.64__

The mean time for **all seven** men was 9.83 seconds.

Did Adam win the race?

You must show your working.

Total for 6 = 59.14

$$\frac{59.14 + \underline{\quad}}{7} = 9.83$$

Adam = (9.83×7) - 59.14
= 9.64

Yes adam won the race   [3]

9. At a nursery, the mean age of 4 children is 31 months.

Katy joins the nursery.

The mean age of all 5 children is now 30 months.

Work out the age of Katy.

number:- 4   5

Mean 31 months   30 months

                                                    [4]

total
age   124 months   150 months   Difference = 26 months

Katy is 26 months old

CREDITS AND NOTES

Question	Awarding Body	Question	Awarding Body
1	WJEC Eduqas	9	AQA
2	AQA		
3	AQA		
4	Pearson Edexcel		
5	Pearson Edexcel		
6	Pearson Edexcel		
7	AQA		
8	AQA		

Notes:

These questions have been retyped from the original sample/specimen assessment materials and whilst every effort has been made to ensure there are no errors, any that do appear are mine and not the exam board s (similarly any errors I have corrected from the originals are also my corrections and not theirs!).

Please also note that the layout in terms of fonts, answer lines and space given to each question does not reflect the actual papers to save space.

These questions have been collated by me as the basis for a GCSE working party set up by the GLOW maths hub - if you want to get involved please get in touch. The objective is to provide support to fellow teachers and to give you a flavour of how different topics "could" be examined. They should not be used to form a decision as to which board to use. There is no guarantee that a topic will or won't appear in the "live" papers from a specific exam board or that examination of a topic will be as shown in these questions.

Links:

AQA http://www.aqa.org.uk/subjects/mathematics/gcse/mathematics-8300

OCR http://ocr.org.uk/gcsemaths

Pearson Edexcel http://qualifications.pearson.com/en/qualifications/edexcel-gcses/mathematics-2015.html

WJEC Eduqas http://www.eduqas.co.uk/qualifications/mathematics/gcse/

Contents:

This version contains questions from:

AQA – Sample Assessment Material, Practice set 1 and Practice set 2

OCR – Sample Assessment Material and Practice set 1

Pearson Edexcel – Sample Assessment Material, Specimen set 1 and Specimen set 2

WJEC Eduqas – Sample Assessment Material