Write your name, centre number and candidate number in the boxes below.

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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Averages and range

Time allowed: 55 minutes

Subject code **0580**

Mathematics

Questions from Paper 1, Paper 2, Paper 3 and Paper 4

You must have: a ruler marked in centimetres and millimetres, a protractor, compasses, a pen, an HB pencil and an eraser.
You may use a calculator.

Total marks

/ 44

Instructions

- Answer every question in the space provided on this paper.
- Write in black or dark blue ink. Pencil may be used for diagrams and graphs.
- Fill in your name, centre number and candidate number above.
- Show your working: a correct method can earn marks even if the answer is wrong.
- Unless a question says otherwise, give answers that are not exact to 3 significant figures, and angles in degrees to 1 decimal place.

Information

- This paper has 10 questions worth 44 marks in total.
- The marks for each question or part are shown in brackets, for example [3].

Advice

- Read every question through once before you write anything.
- Use the marks in brackets to judge how long to spend on each part.
- If you finish early, go back and check your working.

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Print at 100% (Actual size) so diagrams keep their real measurements.

1 The median of six numbers is 61.
Five of the numbers are 24, 43, 58, 71 and 85.

Work out the sixth number.

..... [1]

Mean, median and mode Click for more variations

1	64	**1**	

2 The number of items that each of 22 people buy in a supermarket is shown in the stem-and-leaf diagram.

1	1 3 6 6
2	0 2 2 2 4 8 9
3	1 1 5 8 9 9
4	2 4 6 7 8

Key: 1 | 1 represents 11 items

(a) Find the mode.

..... [1]

(b) Find the median.

..... [1]

(a) Mean, median and mode (b) Mean, median and mode Click for more variations

2(a)	22	**1**	
2(b)	30	**1**	

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3 A town has two cinemas, Movie Scene and Flix.
The table shows the mean and range of the audience numbers.

	Mean	Range
Movie Scene	83	52
Flix	105	25

(a) Which cinema has higher audience numbers on average?
Give a reason for your choice.

Cinema ..... because .....

..... [1]

(b) Which cinema has greater variation in its audience numbers?
Give a reason for your choice.

Cinema ..... because .....

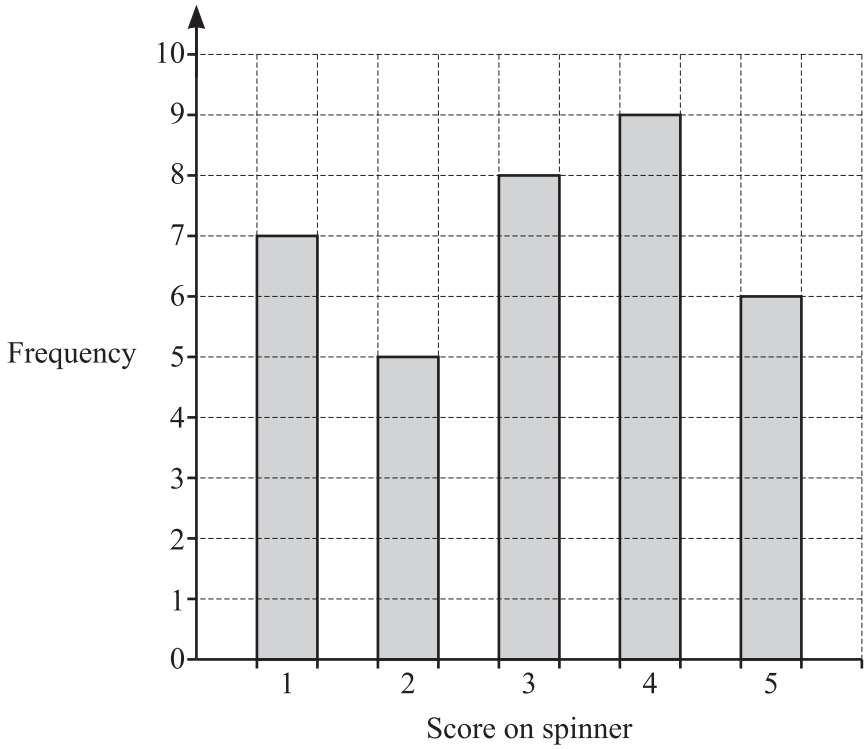
..... [1]

(a) Mean, median and mode (b) Mean, median and mode Click for more variations

3(a)	Flix AND higher mean oe	**1**	
3(b)	Movie Scene AND higher range oe	**1**	

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4 The bar chart shows the frequency of each score on a spinner.



Calculate the mean score.

..... [3]

Averages from tables Click for more variations

4	3.06 or 3.057…	**3**	**M1** for $(1 \times 7) + (2 \times 5) + (3 \times 8) + (4 \times 9) + (5 \times 6)$ **M1dep** for *their* $\sum fx \div (7+5+8+9+6)$

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5 $5n$ is the mean of the three numbers 391, n and $n - 1$.

Find the value of n.

$n =$ ..... [3]

Calculations with the mean Click for more variations

5	30	**3**	**M1** for $\frac{391+n+n-1}{3} = 5n$ oe **M1** for correct first step for solving *their* equation e.g. $391+n+n-1=3\times5n$, $\frac{390+2n}{3} = 5n$

6 Each student in a class of 20 students records the number of coins in their pockets.
The table shows the results.

Number of coins	0	1	2	3	4	5	6
Frequency	3	1	7	8	0	0	1

(a) Find the median.

..... [1]

(b) Calculate the mean.

..... [3]

(a) Averages from tables (b) Averages from tables Click for more variations

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6(a)	2	**1**	

6(b)	2.25	**3**	**M1** for [3×0] + 1×1 + 7×2 + 8×3 + [0×4] + [0×5] + 1×6 oe or for 45 **M1 dep** for $\frac{their\Sigma fx}{20}$ dep on first M1

7 These are Rahul's 10 test scores.

9 8 9 10 7 x 9 9 x 7

The mean of these scores is 8.

Find the interquartile range.
You must show all your working.

..... [4]

Range and interquartile range Click for more variations

7	$\frac{68+2x}{10}=8$ or better	**M1**	
	$x = 6$	**A1**	
	Lower quartile = 6.5 or 6.75 or 7 or upper quartile = 9	**B1**	
	2 or 2.25 or 2.5 nfww	**A1**	

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8 **(a)** Mei writes down five integers.

- The lowest integer is 8.
- The range is 9.
- The median is 15.
- The total of the five integers is 66.
- There is no mode.

Write down the five integers.

..... , ... , ... , ... , ... [3]

(b) Huan writes down four numbers.
The mean of these four numbers is 17.

He writes down a fifth number.
The mean of these five numbers is 20.

Find the fifth number.

..... [3]

(a) Mean, median and mode (b) Calculations with the mean Click for more variations

8(a)	8 10 15 16 17	**3**	**B1** for 8 as lowest and 17 as highest **B1** for 15 as the median of *their* integers **B1** for two other integers such that the total of all 5 of *their* integers is 66 and there are no repeated integers.
8(b)	32	**3**	**M1** for 4×17 soi **M1** for 5×20 soi

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9 40 students are asked about the number of people in their families.

The table shows the results.

Number of people in family	2	3	4	5	6	7
Frequency	1	1	17	12	6	3

(a) Find

(i) the mode,

Answer(a)(i) ..... [1]

(ii) the median,

Answer(a)(ii) ..... [1]

(iii) the mean.

Answer(a)(iii) ..... [3]

(b) Another n students are asked about the number of people in their families.

The mean for these n students is 3.

Find, in terms of n, an expression for the mean number for all $(40 + n)$ students.

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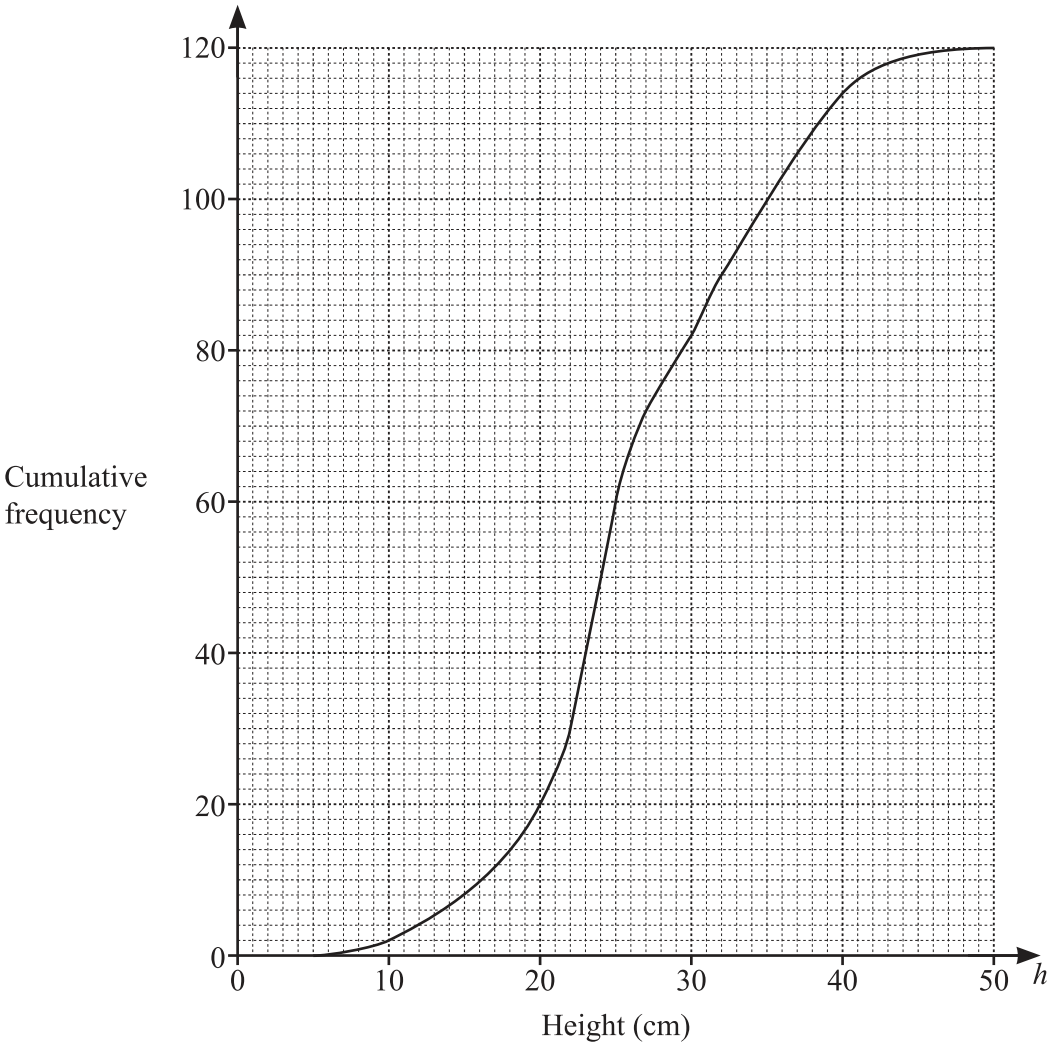
Answer(b) ..... [2]

(a)(i) Averages from tables (a)(ii) Averages from tables (a)(iii) Averages from tables
(b) Calculations with the mean Click for more variations

9 (a) (i)	4	1	
(ii)	5	1	
(iii)	4.75	3	**M1** for $1\times2+1\times3+17\times4+12\times5+6\times6+3\times7$ condone one slip **then** **M1** dependent result (190) ÷ 40
(b)	$\frac{190+3n}{40+n}$	2	**SC1** for their $190 + 3n$

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10 The height, h cm, of each of 120 plants is measured.
The cumulative frequency diagram shows this information.



(a) Use the cumulative frequency diagram to find an estimate of

(i) the median,

..... cm [1]

(ii) the interquartile range,

..... cm [2]

(iii) the 60th percentile,

..... cm [1]

(iv) the number of plants with a height greater than 40 cm.

..... [2]

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(b) The information in the cumulative frequency diagram is shown in this frequency table.

Height, h cm	$0 < h \leqslant 10$	$10 < h \leqslant 20$	$20 < h \leqslant 30$	$30 < h \leqslant 50$
Frequency	2	18	62	38

(i) Calculate an estimate of the mean height.

..... cm [4]

(ii) A histogram is drawn to show the information in the frequency table.
The height of the bar representing the interval $10 < h \leqslant 20$ is 7.2 cm.

Calculate the height of the bar representing the interval $30 < h \leqslant 50$.

..... cm [2]

(a)(i) Cumulative frequency (a)(ii) Range and interquartile range (a)(iii) Cumulative frequency
(a)(iv) Cumulative frequency (b)(i) Averages from grouped data (b)(ii) Histograms Click for more variations
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10(a)(i)	25	**1**	
10(a)(ii)	10 nfww	**2**	**B1** for [lq =] 22 or [uq =] 32
10(a)(iii)	27	**1**	
10(a)(iv)	6	**2**	**B1** for 114 written
10(b)(i)	27.9 or 27.91 to 27.92 nfww	**4**	**M1** for mid-values **M1** for $\sum fx$ where x lies within or on boundary of correct interval **M1 dep** $\sum fx \div 120$ dep on second M1
10(b)(ii)	7.6	**2**	**M1** for $\frac{18}{10}$ oe or $\frac{38}{20}$ oe or **B1** for [multiplier] 4 or ¼

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