Diagrams

Question Paper 7

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Representation of data
Sub Topic	Diagrams
Booklet	Question Paper 7

Time Allowed: 68 minutes

Score: /56

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1   A hotel has 90 rooms. The table summarises information about the number of rooms occupied each day for a period of 200 days.

Number of rooms occupied	1 – 20	21 – 40	41 – 50	51 – 60	61 – 70	71 – 90
Frequency	10	32	62	50	28	18

  (i) Draw a cumulative frequency graph on graph paper to illustrate this information.   [4]

 (ii) Estimate the number of days when over 30 rooms were occupied.   [2]

(iii) On 75% of the days at most n rooms were occupied. Estimate the value of n.   [2]

2   The following cumulative frequency table shows the examination marks for 300 candidates in country A and 300 candidates in country B.

Mark	<10	<20	<35	<50	<70	<100
Cumulative frequency, A	25	68	159	234	260	300
Cumulative frequency, B	10	46	72	144	198	300

  (i) Without drawing a graph, show that the median for country B is higher than the median for country A.   [2]

 (ii) Find the number of candidates in country A who scored between 20 and 34 marks inclusive.   [1]

(iii) Calculate an estimate of the mean mark for candidates in country A.   [4]

3   The numbers of people travelling on a certain bus at different times of the day are as follows.

$$17 \quad 5 \quad 2 \quad 23 \quad 16 \quad 31 \quad 8$$
$$22 \quad 14 \quad 25 \quad 35 \quad 17 \quad 27 \quad 12$$
$$6 \quad 23 \quad 19 \quad 21 \quad 23 \quad 8 \quad 26$$

  (i) Draw a stem-and-leaf diagram to illustrate the information given above.   [3]

 (ii) Find the median, the lower quartile, the upper quartile and the interquartile range.   [3]

(iii) State, in this case, which of the median and mode is preferable as a measure of central tendency, and why.   [1]

4 Cumulative frequency
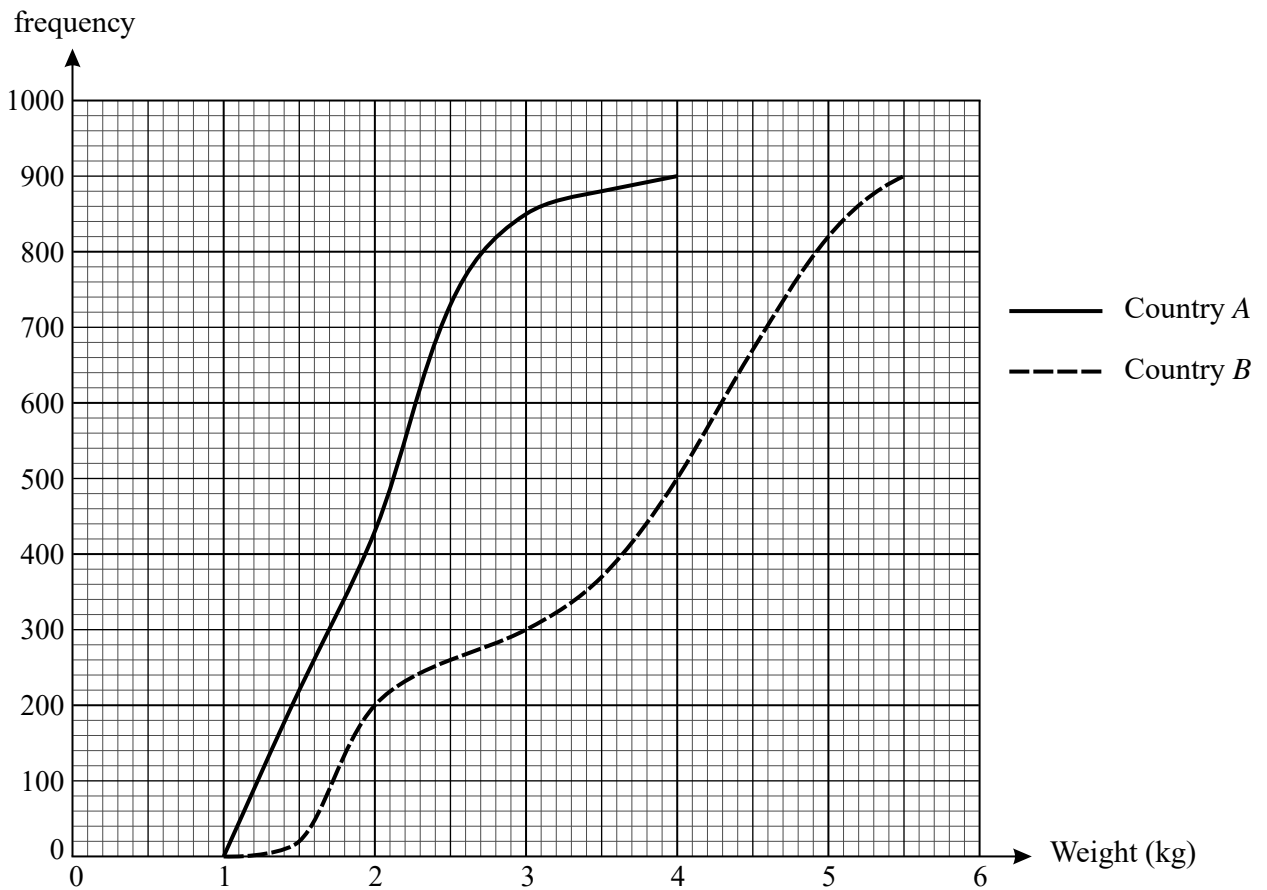
The birth weights of random samples of 900 babies born in country *A* and 900 babies born in country *B* are illustrated in the cumulative frequency graphs. Use suitable data from these graphs to compare the central tendency and spread of the birth weights of the two sets of babies. [6]

5 The lengths of some insects of the same type from two countries, X and Y, were measured. The stem-and-leaf diagram shows the results.

	Country X			Country Y	
(10)	9 7 6 6 6 4 4 4 3 2	80			
(18)	8 8 8 7 7 6 6 5 5 5 5 4 4 3 3 3 2 2 0	81	1 1 2 2 3 3 3 5 5 6 7 8 9	(13)
(16)	9 9 9 8 8 7 7 6 5 5 3 2 2 1 0 0	82	0 0 1 2 3 3 3 q 4 5 6 6 7 8 8	(15)
(16)	8 7 6 5 5 5 3 3 2 2 2 1 1 1 0 0	83	0 1 2 2 4 4 4 4 5 5 6 6 7 7 7 8 9	(17)
(11)	8 7 6 5 5 4 4 3 3 1 1	84	0 0 1 2 4 4 5 5 6 6 7 7 7 8 9	(15)
		85	1 2 r 3 3 5 5 6 6 7 8 8	(12)
		86	0 1 2 2 3 5 5 5 8 9 9	(11)

Key: 5 | 81 | 3 means an insect from country X has length 0.815 cm
and an insect from country Y has length 0.813 cm.

(i) Find the median and interquartile range of the lengths of the insects from country X. [2]

(ii) The interquartile range of the lengths of the insects from country Y is 0.028 cm. Find the values of q and r. [2]

(iii) Represent the data by means of a pair of box-and-whisker plots in a single diagram on graph paper. [4]

(iv) Compare the lengths of the insects from the two countries. [2]

6 During January the numbers of people entering a store during the f rst hour after opening were as follows.

Time after opening, x minutes	Frequency	Cumulative frequency
$0 < x \leqslant 10$	210	210
$10 < x \leqslant 20$	134	344
$20 < x \leqslant 30$	78	422
$30 < x \leqslant 40$	72	a
$40 < x \leqslant 60$	b	540

   (i) Find the values of a and b. [2]

  (ii) Draw a cumulative frequency graph to represent this information. Take a scale of 2 cm for 10 minutes on the horizontal axis and 2 cm for 50 people on the vertical axis. [4]

 (iii) Use your graph to estimate the median time after opening that people entered the store. [2]

 (iv) Calculate estimates of the mean, m minutes, and standard deviation, s minutes, of the time after opening that people entered the store. [4]

  (v) Use your graph to estimate the number of people entering the store between $(m - \frac{1}{2}s)$ and $(m + \frac{1}{2}s)$ minutes after opening. [2]

7 The stem-and-leaf diagram below represents data collected for the number of hits on an internet site on each day in March 2007. There is one missing value, denoted by x.

```
0 | 0 1   6              (4)
1 | 1 3   6 6 8          (6)
2 | 1 1   3 4 4 4 8 9    (9)
3 | 1 2   2 x 8 9        (7)
4 | 2 5   7 9            (5)
```

Key: 1 | 5 represents 15 hits

  (i) Find the median and lower quartile for the number of hits each day. [2]

 (ii) The interquartile range is 19. Find the value of x. [2]