STATISTICS (Q 7, PAPER 2)

2000

7 (a) Find the weighted mean of 11, 15, 19 and 21 if the weights are 2, 3, 1 and 2 respectively.

(b) The table shows the distribution of points obtained by 50 people who took a driving test.

Points obtained	0 – 20	20 – 40	40 – 80	80 – 100
Number of people	4	8	28	10

(i) Draw a histogram to illustrate the data.

(ii) To pass the driving test a person must obtain 65 points or more. What is the greatest possible number of people who passed the test?

(c) The table below refers to the number of emergency calls recorded at a fire station each week for 52 weeks.

No. of emergency calls	0 – 10	11 – 20	21 – 30	31 – 40	41 – 50	51 – 60	61 – 70
Number of weeks	6	8	11	12	7	5	3

(i) Copy and complete the following cumulative frequency table:

No. of emergency calls	≤ 10	≤ 20	≤ 30	≤ 40	≤ 50	≤ 60	≤ 70
Number of weeks	6						52

(ii) Draw the cumulative frequency curve.

(iii) Use your graph to estimate the interquartile range.

(iv) Use your graph to estimate the number of weeks during which more than 56 emergency calls were recorded.

SOLUTION

7 (a)

$$\bar{w} = \frac{\sum wx}{\sum w} = \frac{128}{8} = 16$$

x	w	wx
11	2	22
15	3	45
19	1	19
21	2	42
	8	128

$\bar{w} = \dfrac{\sum wx}{\sum w}$ **3**

7 (b) (i)

Points obtained	0 – 20	20 – 40	40 – 80	80 – 100
Number of people	4	8	28	10

Each column in the table is represented by a rectangular box. The area of the box corresponds to the frequency (no. of students).

Area (No. of students) = Base × Height = Frequency

Look at the points obtained. Pick out the smallest interval (0 – 20) and make this base one unit. Therefore the interval 40 – 80 has a base of 2 units. Divide the base into the area (frequency) to get the height of a box.
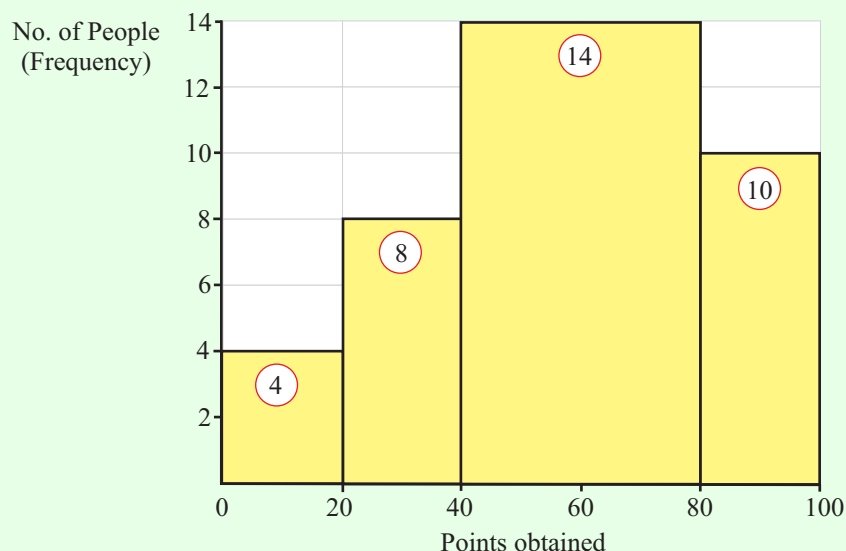
Draw a new table:

Interval (Points)	0 – 20	20 – 40	40 – 80	80 – 100
Frequency (No. of people)	4	8	28	10
Base	1	1	2	1
Height	4	8	14	10

Drawing the histogram:
Horizontal (*x*-axis) axis (Points): Look at the intervals. The points go from 0 to 100. The smallest interval (Base 1) is 20 so go up in 20's.
Vertical (*y*-axis) axis (No. of people): Always start at zero. The biggest number is the maximum height (i.e. 14).
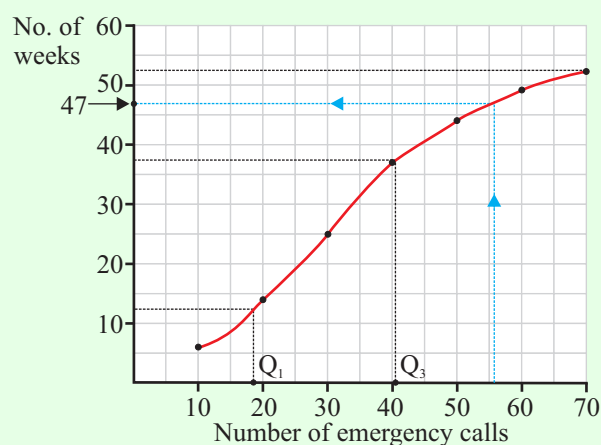

7 (b) (ii)

28 people received between 40 and 80 points. All 28 people in the group could have received 65 points or more. Therefore, the greatest possible number of people who passed the test = 28 + 10 = 38 people.

7 (c) (i)

No. of emergency calls	≤ 10	≤ 20	≤ 30	≤ 40	≤ 50	≤ 60	≤ 70
Number of weeks	6	14	25	37	44	49	52

7 (c) (ii)

7 (c) (iii)

The lower quartile (Q_1): Go to 13 on the vertical axis (one-quarter of the number of weeks). The lower quartile is 19 calls.

The upper quartile (Q_3): Go to 39 on the vertical axis (three-quarters of the number of weeks). The upper quartile is 42 calls.

Interquartile range: $Q_3 - Q_1 = 42 - 19 = 23$

7 (c) (iv)

No. of weeks receiving more that 56 emergency calls: Go to 56 on the horizontal axis. You can see that you arrive at 47. Therefore the number of weeks is $= 52 - 47 = 5$ weeks.