

**STATISTICS (Q 7, PAPER 2)**

**2007**

- 7 (a) Find the median of the numbers  
5, 11, 3, 16, 8.

- (b) The table below shows the time, in minutes, that customers were waiting to be served in a restaurant.

Time (minutes)	< 5	< 10	< 15	< 20	< 25
Number of customers	5	20	70	110	120

- (i) Draw a cumulative frequency curve (ogive).  
(ii) Use your curve to estimate the median waiting time.  
(iii) Use your curve to estimate the interquartile range.
- (c) The age of each person living in one street was recorded during a census. The information is summarised in the following table:

Age (in years)	0 – 20	20 – 30	30 – 50	50 – 80
Number of people	16	12	32	12

- (i) How many people were living in the street?  
(ii) Using mid-interval values, calculate the mean age.  
(iii) What is the greatest number of people who could have been aged under 40 years?

**SOLUTION**

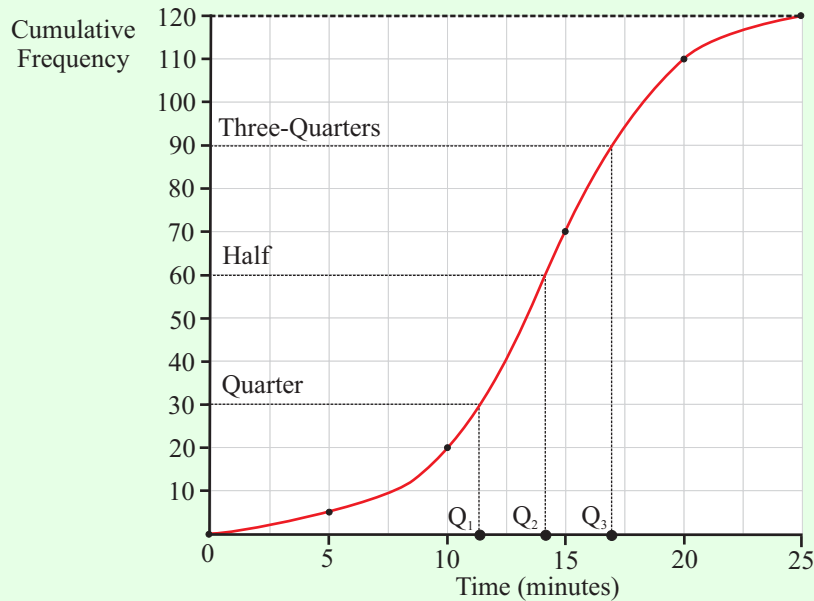
**7 (a)**

The **MEDIAN** is the middle number when you line up all the numbers in increasing order.

3, 5, 8, 11, 16

The median is 8.

7 (b) (i)



7 (b) (ii)

**Median ( $Q_2$ ):** The total number of customers was 120. Half of this number is 60. The median is 14 minutes.

7 (b) (iii)

**The lower quartile ( $Q_1$ ):** Go to 30 on the vertical axis (one-quarter of the customers). The lower quartile is 11 minutes.

**The upper quartile ( $Q_3$ ):** Go to 90 on the vertical axis (three-quarters of the students). The upper quartile is 17 minutes.

**The interquartile range:**  $Q_3 - Q_1 = 17 - 11 = 6$  minutes

7 (c)

Draw up a frequency table using the mid-interval values. To get a mid-interval value add the two numbers together and divide by 2.

**Ex.** Class interval: 50 – 80

Mid-interval value:  $\frac{50+80}{2} = 65$

$x$	$f$	$fx$
10	16	160
25	12	300
40	32	1280
65	12	780
	72	2520

7 (c) (i)

Number of people (frequency) =  $16 + 12 + 32 + 12 = 72$

7 (c) (ii)

$$\bar{x} = \frac{f_1x_1 + f_2x_2 + \dots + f_Nx_N}{f_1 + f_2 + \dots + f_N} = \frac{\sum fx}{\sum f} \quad \dots \quad \textcircled{2}$$

Mean age:  $\bar{x} = \frac{\sum fx}{\sum f} = \frac{2520}{72} = 35$

7 (c) (iii)

Those people in the 30 – 50 age group can be any age from 30 up to 50 years of age. In the greatest number situation, all the people in this group could be under 40. Therefore, the greatest number of people under 40 is:

$16 + 12 + 32 = 60$