Name:

Exam Style Questions

Medians and Quartiles from Grouped Data (Interpolation)

Corbettmaths

Ensure you have: Pencil, pen, ruler, protractor, pair of compasses and eraser

You may use tracing paper if needed

Guidance

1. Read each question carefully before you begin answering it.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Revision for this topic

www.corbettmaths.com/contents

Video 52

1. 100 students sat a physics examination.
   The time they spent revising is shown in the table.

Hours, h	Frequency	
$0 < h \le 5$	27	⎫ 23
✱ $5 < h \le 10$	44	⎭
$10 < h \le 15$	21	
$15 < h \le 20$	8	

By using linear interpolation, find the median time spent revising.

$$\frac{100}{2} = 50^{th} \text{ value}$$

$$5 + \frac{23}{44} \times 5 = 7.6136\ldots$$

7.61 ....hours

(3)

2. Alison measures the heights of her plants in her greenhouse.

Height (x cm)	Frequency
$0 < x \leq 10$	3
$10 < x \leq 20$	7
LQ∗ $20 < x \leq 30$	12
M∗ $30 < x \leq 40$	31
UQ∗ $40 < x \leq 50$	27

80

(a) Find the median height.

$$\frac{80}{2} = 40^{th} \text{ value}$$

$$30 + \frac{18}{31} \times 10$$

35.806

...........................cm

(3)

(b) Find the lower quartile.

$$\frac{80}{4} = 20^{th} \text{ value}$$

$$20 + \frac{10}{12} \times 10$$

28.333

...........................cm

(3)

(c) Find the upper quartile.

$$60^{th} \text{ value}$$

$$40 + \frac{7}{27} \times 10$$

42.593

...........................cm

(3)

(d) Find the interquartile range.

$$42.593 - 28.333$$

14.26

...........................cm

(1)

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3. The weights of some rugby players are recorded in the table below.

Weight (x kg)	Frequency	midpoint	fx
60 < x ≤ 64	10	62	620
64 < x ≤ 68	20	66	1320
68 < x ≤ 72	30	70	2100
72 < x ≤ 76	15	74	1110
76 < x ≤ 80	18	78	1404
80 < x ≤ 84	7	82	+ 574

100

7128

(a) Calculate an estimate of the mean weight.

$7128 \div 100 =$

71.28 ....kg

(3)

(b) Find the median by using linear interpolation.

50ᵗʰ value

$68 + \dfrac{20}{30} \times 4$

$70\frac{2}{3}$ (70·667) ....kg

(3)

(c) Calculate the interquartile range.

LQ: 25ᵗʰ value

$64 + \dfrac{15}{20} \times 4 = 67$

UQ: 75ᵗʰ value $= 76$

76 − 67 = 9

9 ....kg

(4)

4. A scheme has been introduced to encourage **younger people** to buy houses.
In Sunderland, 1200 houses were bought in 2014 under the scheme.
The table below shows the ages of the home buyers.

Age (A years)	Frequency	midpoint	fx
20 < A ≤ 25	145	22.5	3262.5
25 < A ≤ 30	200	27.5	5500
30 < A ≤ 35	94	32.5	3055
35 < A ≤ 40	141	37.5	5287.5
✳ 40 < A ≤ 45	294	42.5	12495
45 < A ≤ 50	326	47.5	15485
	1200		45076

A brochure is being created that will contain the average age of these home
buyers. The brochure writer would like this average to be as low as possible to
show that young people are benefitting from the scheme.

Should the brochure contain the mean or the median?
Explain your answer.

Mean: $45076 \div 1200 = 37.56333...$

Median: 600th value

$$40 + \frac{20}{294} \times 5 = 40.34....$$

As they wanted to encourage younger people
to buy houses, the MEAN would be the
best average to use.

(6)