Name:

Exam Style Questions

Medians and Quartiles from Grouped Data (Interpolation)

Corbettmaths

Equipment needed: Pen, Calculator

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

www.corbettmaths.com/contents

Video 52

Answers and Video Solutions

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

Hours, h	Frequency
$0 < h \leq 5$	27
$5 < h \leq 10$	44
$10 < h \leq 15$	21
$15 < h \leq 20$	8

100

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

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

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

Also accept approach using 50.5^{th} value.

7.614 .....hours
(3)

2. 50 people work for a company.

The table shows information about their monthly salaries, in pounds (£).

Monthly Salary	Frequency
$1600 \leq s < 2400$	21
$2400 \leq s < 3200$	12
$3200 \leq s < 4000$	9
$4000 \leq s < 4800$	5
$4800 \leq s < 5600$	3

50

Find an estimate of the median monthly salary.

$\frac{50}{2} = 25^{th}$ value.

$2400 + \frac{4}{12} \times 800 = £2666.66...$

Also accept approach based on 25.5^{th} value.

£ 2666.67

(3)

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

Height (x cm)	Frequency
$0 < x \leq 10$	3
$10 < x \leq 20$	7
$20 < x \leq 30$	12
$30 < x \leq 40$	31
$40 < x \leq 50$	27
	80

LQ *
M *
UQ *

(a) Find an estimate of the median height.

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

$30 + \frac{18}{31} \times 10 = 35.806$

35.806 .....cm

(3)

(b) Find an estimate of the lower quartile.

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

$20 + \frac{10}{12} \times 10 = 28.33..$

28.333 .....cm

(3)

(c) Find an estimate of the upper quartile.

$\frac{80}{4} = 20 \quad 20 \times 3 = 60^{th}$

$40 + \frac{7}{27} \times 10 = 42.59259..$

42.593 .....cm

(3)

(d) Find an estimate of the interquartile range.

$42.593.. - 28.333..$

14.26 .....cm

(1)

Also accept approaches finding 40.5^{th}, 20.5^{th} etc.

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

Weight (x kg)	Frequency	midpoint	fx
$60 < x \leq 64$	10	62	620
$64 < x \leq 68$	20	66	1320
$68 < x \leq 72$	30	70	2100
$72 < x \leq 76$	15	74	1110
$76 < x \leq 80$	18	78	1404
$80 < x \leq 84$	7	82	574
	100		7128

(a) Calculate an estimate of the mean weight.

$7128 \div 100 = 71.28$

71.28 kg

(3)

(b) Find an estimate of the median by using linear interpolation.

50^{th} value

$68 + \frac{20}{30} \times 4 = 70.666...$

70.67 kg to 2 dp

Also accept approach using 50.5^{th}.

(3)

(c) Calculate an estimate of the interquartile range.

LQ : 25^{th} value

UQ : 75^{th} value

LQ : $64 + \frac{15}{20} \times 4 = 67$

UQ : 76

$76 - 67$

9 kg

(4)

Also accept approach using 25.5th etc.

5. A scheme has been introduced to encourage **younger people** to buy houses.
In Sunderland, 1200 houses were bought in 2023 under the scheme.
The table below shows the ages of the home buyers.

Age (A years)	Frequency	midpoint	fx
$20 < A \leq 25$	145	22.5	3262.5
$25 < A \leq 30$	200	27.5	5500
$30 < A \leq 35$	94	32.5	3055
$35 < A \leq 40$	141	37.5	5287.5
* $40 < A \leq 45$	294	42.5	12495
$45 < A \leq 50$	326	47.5	+ 15485
	1200		45085

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 : $45085 \div 1200 = 37.5708...$

median : 600^{th} value

$40 + \frac{20}{294} \times 5 = 40.3401...$

The brochure should use the mean as it gives a younger age.

(6)

* Accept approach based on 600.5^{th} value.