

P19- Averages from a Grouped
Frequency Table

OCR

21 The table below shows the number of texts Natalie sent each day over a period of 75 days.

Number of texts	Frequency		
0 – 4	12		
5 – 9	15		
10 – 14	8		
15 – 19	24		
20 – 24	16		

(a) Calculate an estimate of the mean of these data.

(a) [4]

(b) Explain why your answer is an estimate.

.....
..... [1]

21 The table below shows the number of texts Natalie sent each day over a period of 75 days.

Number of texts	Frequency		Midpoint	
0 – 4	12	X	2	24
5 – 9	15	X	7	105
10 – 14	8	X	12	96
15 – 19	24	X	17	408
20 – 24	16	X	22	352

(a) Calculate an estimate of the mean of these data.

$$\frac{985}{75}$$

(a) 13.13 [4]

(b) Explain why your answer is an estimate.

I used midpoints. I don't know exact values.

[1]

13 The table below shows the weight loss, w kg, of 50 members of a slimming club.

Weight loss (kg)	Frequency		
$0 < w \leq 5$	4		
$5 < w \leq 10$	19		
$10 < w \leq 15$	14		
$15 < w \leq 20$	11		
$20 < w \leq 25$	2		

(a) Calculate an estimate of the mean of this data.

(a) kg [4]

(b) Explain why your answer is an estimate.

.....
 [1]

13 The table below shows the weight loss, wkg, of 50 members of a slimming club.

Weight loss (kg)	<u>MP</u>		Frequency		
$0 < w \leq 5$	2.5	X	4	= 10	
$5 < w \leq 10$	7.5	X	19	= 142.5	
$10 < w \leq 15$	12.5	X	14	175	
$15 < w \leq 20$	17.5	X	11	192.5	
$20 < w \leq 25$	22.5	X	2	45	

$$\frac{50}{50} \quad \frac{565}{50}$$

(a) Calculate an estimate of the mean of this data.

$$\frac{565}{50} = 11.3$$

(a) 11.3 kg [4]

(b) Explain why your answer is an estimate.

Exact weight loss is not known so i
 chose the midpoint. [1]

14 A shop records the time taken by its customers to complete a purchase on its website. The results from one day are summarised in this table.

Time taken (t minutes)	Number of customers		
$0 < t \leq 3$	6		
$3 < t \leq 6$	10		
$6 < t \leq 9$	6		
$9 < t \leq 12$	2		
$12 < t \leq 15$	1		

(a) Calculate an estimate of the mean time taken.

(a) minutes [4]

(b) Explain why it is not possible to use the information from this table to calculate the **exact** value of the mean time taken.

.....
.....
..... [1]

- 14 A shop records the time taken by its customers to complete a purchase on its website. The results from one day are summarised in this table.

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Time taken (t minutes)	Number of customers		Midpoint	
$0 < t \leq 3$	6	X	1.5	9
$3 < t \leq 6$	10	X	4.5	45
$6 < t \leq 9$	6	X	7.5	45
$9 < t \leq 12$	2	X	10.5	21
$12 < t \leq 15$	1	X	13.5	13.5

- (a) Calculate an estimate of the mean time taken.

$$\frac{133.5}{25} =$$

(a) 5.34 minutes [4]

- (b) Explain why it is not possible to use the information from this table to calculate the **exact** value of the mean time taken.

Estimating how much time. It does not tell you exactly how long each customer took.

[1]

18 The table below shows the weight, w kg, of the bags that people took on a plane.

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Weight of bag (kg)	Frequency		
$0 < w \leq 10$	16		
$10 < w \leq 15$	10		
$15 < w \leq 20$	20		
$20 < w \leq 25$	8		
$25 < w \leq 30$	6		

Calculate an estimate of the mean weight of the 60 bags.

..... kg [4]

18 The table below shows the weight, w kg, of the bags that people took on a plane.

P19

Weight of bag (kg)	Frequency	<i>X</i>	<i>Midpoint</i>	
		<i>X</i>	<i>5</i>	<i>80</i>
$0 < w \leq 10$	16	<i>X</i>	<i>12.5</i>	<i>125</i>
$10 < w \leq 15$	10	<i>X</i>	<i>17.5</i>	<i>350</i>
$15 < w \leq 20$	20	<i>X</i>	<i>22.5</i>	<i>180</i>
$20 < w \leq 25$	8	<i>X</i>	<i>27.5</i>	<i>165</i>
$25 < w \leq 30$	6 <i>80</i>			

900

Calculate an estimate of the mean weight of the 60 bags.

$$\frac{900}{60} =$$

15 ✓ kg [4]

17 The police record the speed of vehicles passing a speed checkpoint.
The speeds are recorded in the table below.

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Speed (s mph)	Number of vehicles		
$0 < s \leq 20$	5		
$20 < s \leq 40$	8		
$40 < s \leq 50$	37		
$50 < s \leq 60$	47		
$60 < s \leq 80$	3		

(a) Calculate an estimate of the mean speed of the vehicles.

(a) mph [4]

(b) Explain why it is not possible to use the information from this table to calculate the **exact** value of the mean speed.

.....
.....
..... [1]

17 The police record the speed of vehicles passing a speed checkpoint. The speeds are recorded in the table below.

Video created by W Neill

P19

Speed (s mph)	Number of vehicles	Midpoint	
$0 < s \leq 20$	5	X 10	50
$20 < s \leq 40$	8	X 30	240
$40 < s \leq 50$	37	X 45	1665
$50 < s \leq 60$	47	X 55	2585
$60 < s \leq 80$	3	X 70	210

(a) Calculate an estimate of the mean speed of the vehicles.

$$\frac{4750}{100}$$

$$\frac{4750}{100}$$

(a) 47.5 mph [4]

(b) Explain why it is not possible to use the information from this table to calculate the exact value of the mean speed.

..... We have only be given a range of speed
 not exact speeds.

[1]

Edexcel

25 Linda recorded the temperature, in °C, at 9 am on each of 30 days.

Created by W Neill

The table shows information about her results.

Temperature (T °C)	Number of days
$10 < T \leq 12$	3
$12 < T \leq 14$	8
$14 < T \leq 16$	14
$16 < T \leq 18$	4
$18 < T \leq 20$	1

Calculate an estimate for the mean temperature.
Give your answer correct to 1 decimal place.

..... °C

(Total for Question 25 is 3 marks)

25 Linda recorded the temperature, in °C, at 9 am on each of 30 days.

Created by W Neill

The table shows information about her results.

Temperature (T °C)		Number of days	
$10 < T \leq 12$	11	X	3
$12 < T \leq 14$	13	X	8
$14 < T \leq 16$	15	X	14
$16 < T \leq 18$	17	X	4
$18 < T \leq 20$	19	X	1

33

104

210

68

19

30

434

$$\frac{434}{30} = 14.4\bar{6}$$

14.5 °C

Calculate an estimate for the mean temperature.
Give your answer correct to 1 decimal place.

(Total for Question 25 is 3 marks)

22 The table gives information about the times that 100 people took to travel to work.

Video created by W Neill

Time (t minutes)	Frequency
$0 < t \leq 10$	10
$10 < t \leq 20$	26
$20 < t \leq 30$	23
$30 < t \leq 40$	19
$40 < t \leq 50$	14
$50 < t \leq 60$	8

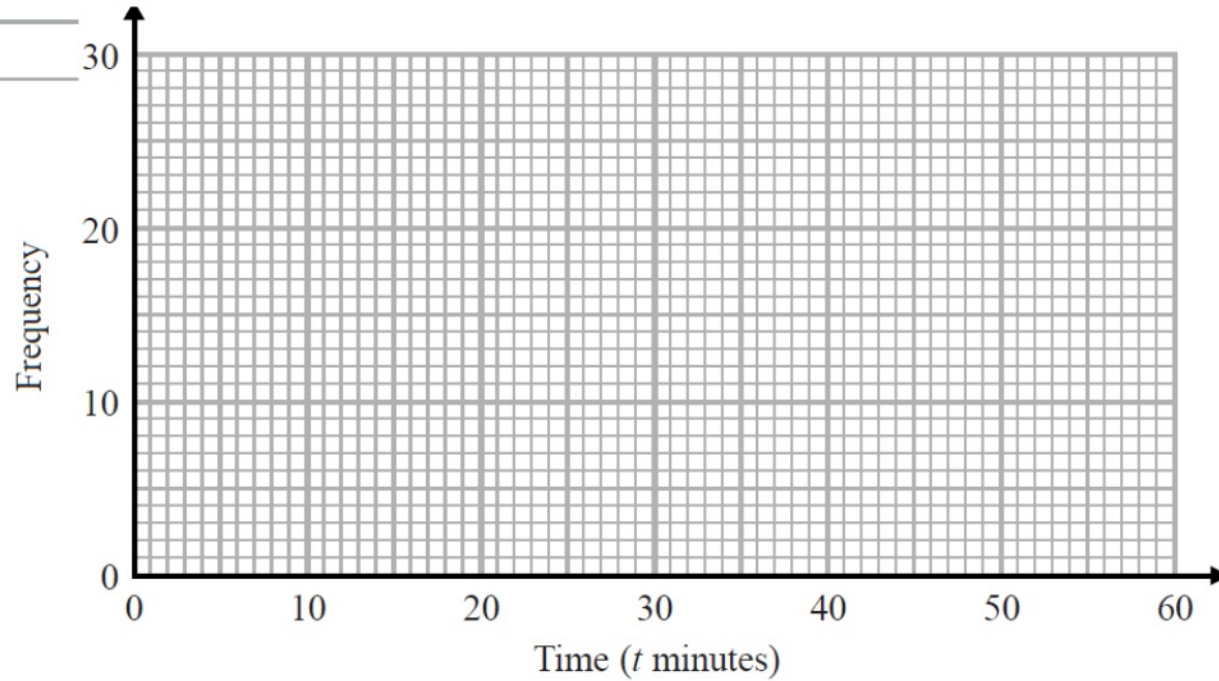
(a) Find the class interval that contains the median.

P19

(1)

(b) Draw a frequency polygon for the information in the table. (2)

P4



22 The table gives information about the times that 100 people took to travel to work.

Video created by W Neill

Time (t minutes)	Frequency
$0 < t \leq 10$	10
$10 < t \leq 20$	26
<u>$20 < t \leq 30$</u>	23
$30 < t \leq 40$	19
$40 < t \leq 50$	14
$50 < t \leq 60$	8

(a) Find the class interval that contains the median.

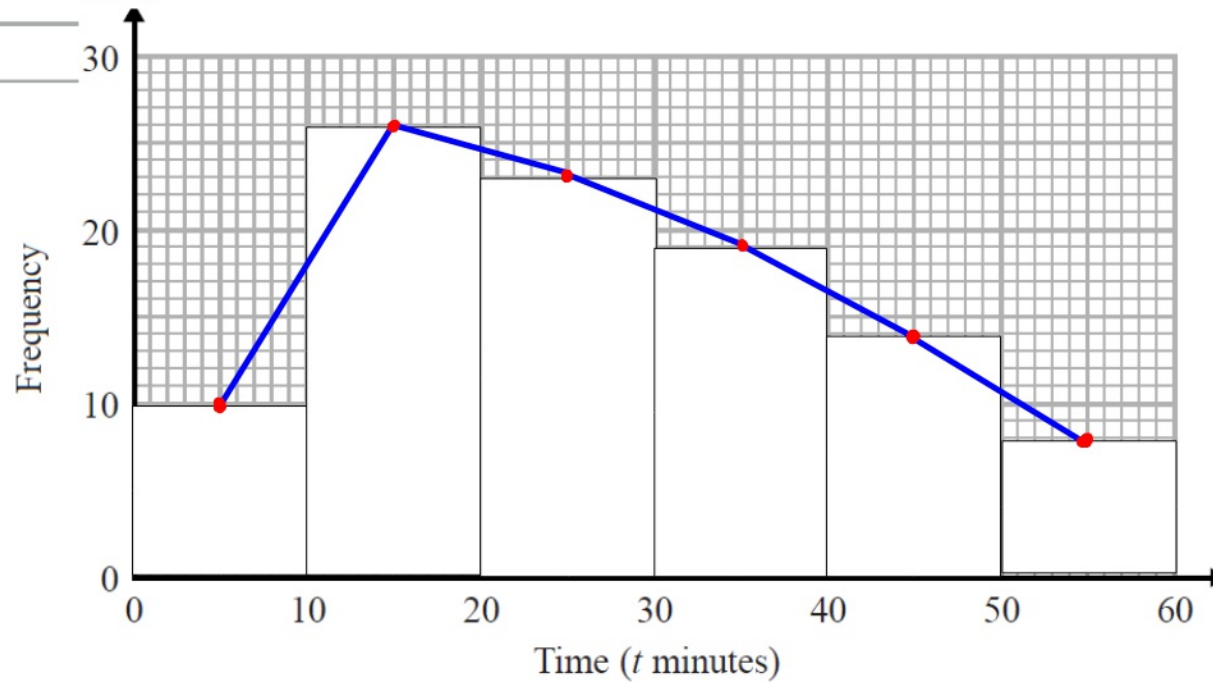
$$20 < t \leq 30$$

(1)

P19

(b) Draw a frequency polygon for the information in the table. (2)

P4



100 people

50th person

$$\frac{100+1}{2} = 50.5^{\text{th}} \text{ person}$$

27 The table shows information about the weekly earnings of 20 people who work in a shop.

Created by W Neill

Weekly earnings (£ x)	Frequency
$150 < x \leq 250$	1
$250 < x \leq 350$	11
$350 < x \leq 450$	5
$450 < x \leq 550$	0
$550 < x \leq 650$	3

(a) Work out an estimate for the mean of the weekly earnings.

£.....
(3)

Nadiya says,

“The mean may **not** be the best average to use to represent this information.”

(b) Do you agree with Nadiya?
You must justify your answer.

27 The table shows information about the weekly earnings of 20 people who work in a shop.

Created by W Neill

Weekly earnings (£x)	Frequency
$150 < x \leq 250$	1
$250 < x \leq 350$	11
$350 < x \leq 450$	5
$450 < x \leq 550$	0
$550 < x \leq 650$	3

20
Nadiya says,

(a) Work out an estimate for the mean of the weekly earnings.

£200
£3300
£2000
£1800

$$\text{Total} = \frac{£7300}{20} = \frac{£730}{2}$$

$$\begin{array}{r} 365 \\ 2 \overline{) 730} \end{array}$$

£ 365
(3)

“The mean may **not** be the best average to use to represent this information.”

(b) Do you agree with Nadiya?
You must justify your answer.

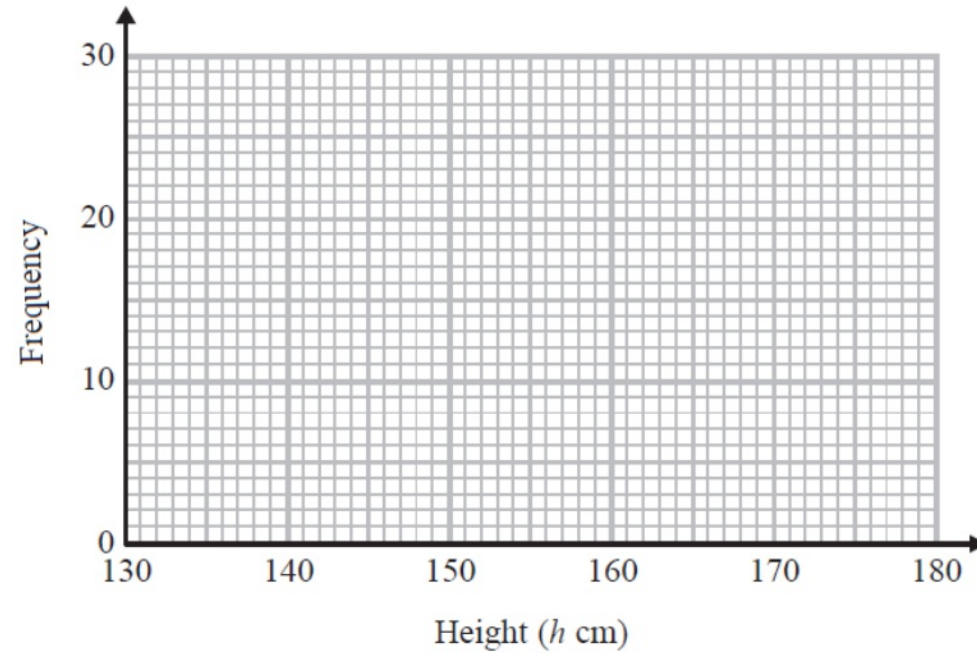
Yes, I agree, the mean is not the best. Most of the staff earn less than £365. The 3x£600 makes the average look bigger. Mode, or Median would be better.

19 The table shows information about the heights of 80 children.

Created by W Neill

Height (h cm)	Frequency
$130 < h \leq 140$	4
$140 < h \leq 150$	11
$150 < h \leq 160$	24
$160 < h \leq 170$	22
$170 < h \leq 180$	19

(a) Find the class interval that contains the median.

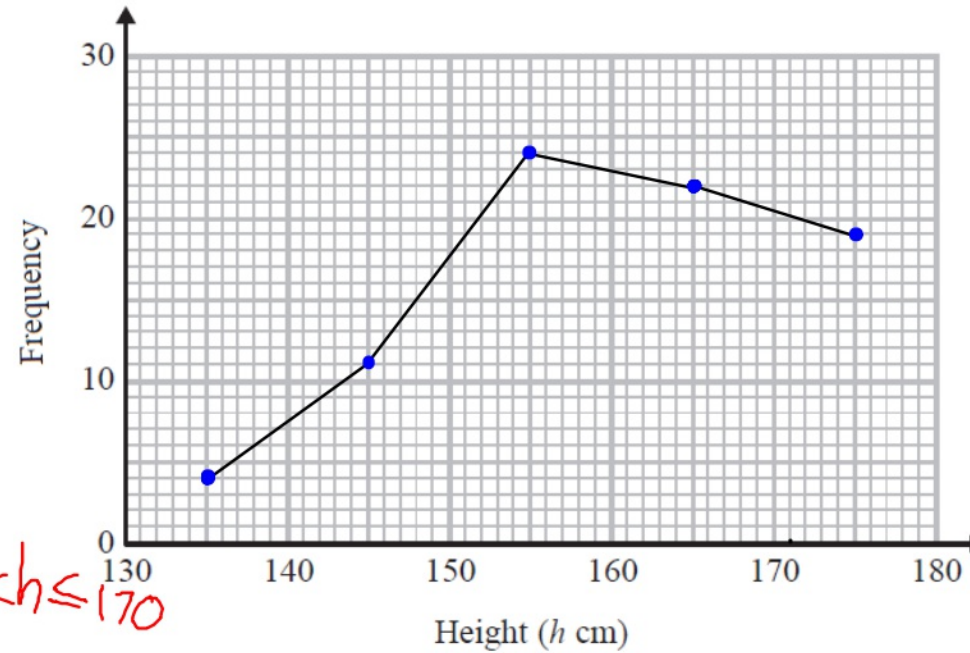


(b) Draw a frequency polygon for the information in the table.

19 The table shows information about the heights of 80 children.

Created by W Neill

Height (h cm)	Frequency
$130 < h \leq 140$	4
$140 < h \leq 150$	11
$150 < h \leq 160$	24
$160 < h \leq 170$	22
$170 < h \leq 180$	19

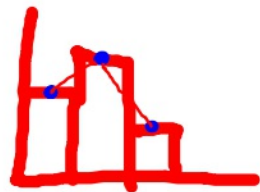


(a) Find the class interval that contains the median.

80 children middle person 40^{th}

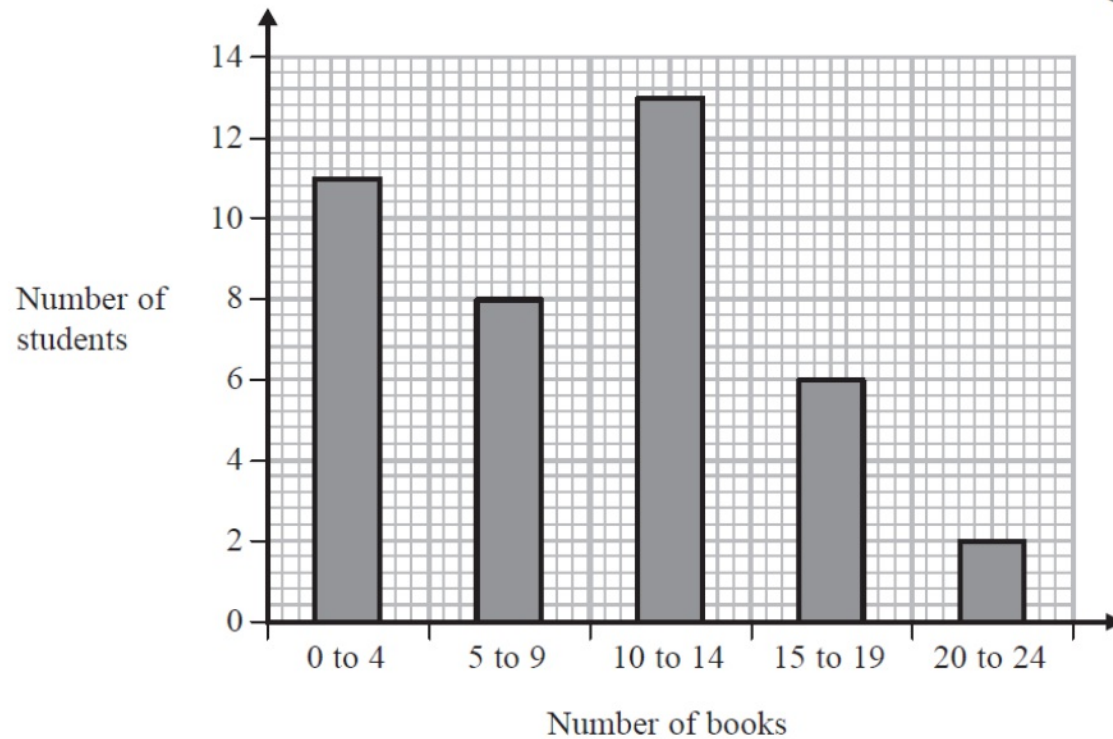
..... $\frac{80+1}{2} = \frac{81}{2} = 40.5^{\text{th}}$ $160 < h \leq 170$

(b) Draw a frequency polygon for the information in the table.



23 Fran asks each of 40 students how many books they bought last year.

The chart below shows information about the number of books bought by each of the 40 students.



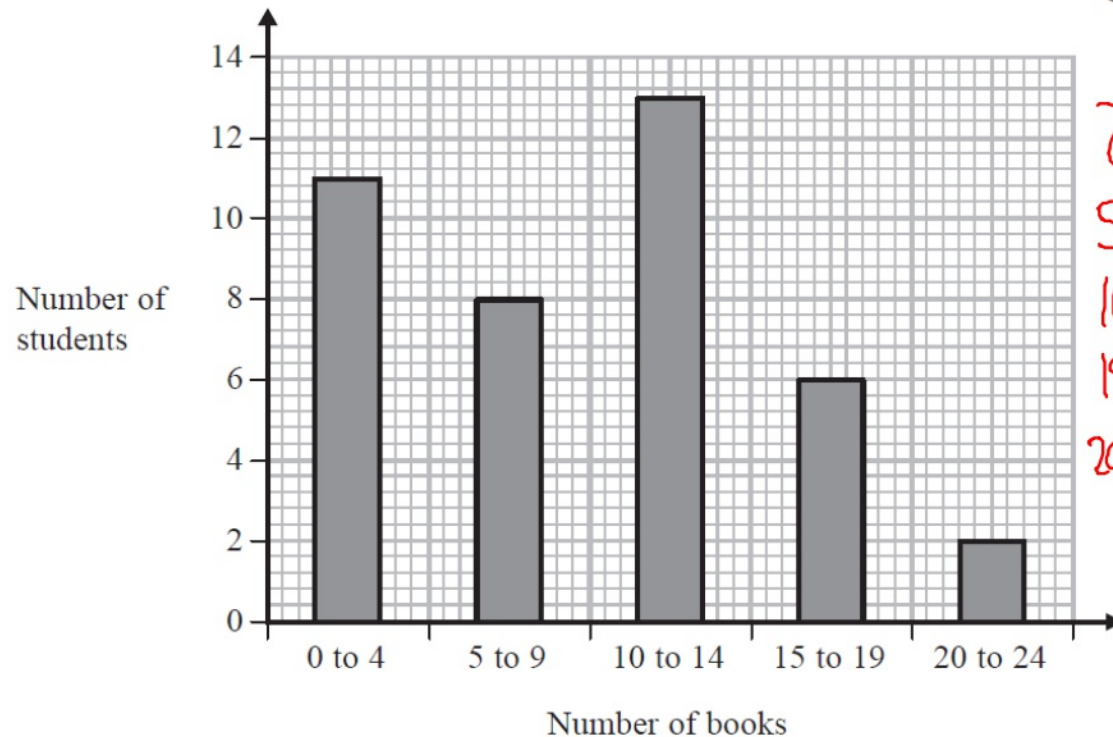
- (b) Show that an estimate for the mean number of books bought is 9.5
You must show all your working.

P19

(4)

Fran asks each of 40 students how many books they bought last year.

The chart below shows information about the number of books bought by each of the 40 students.



	Freq	mp	
0-4	11	x	2
5-9	8	x	7
10-14	13	x	12
15-19	6	x	17
20-24	2	x	22
	40		380

- (b) Show that an estimate for the mean number of books bought is 9.5
You must show all your working.

$$\frac{380}{40} = 9.5 \checkmark$$

AQA

25

The table shows information about the times for 10 people to complete a task.

Video created by W Neill

Time, t (minutes)	Frequency
$0 < t \leq 20$	1
$20 < t \leq 40$	6
$40 < t \leq 60$	3

p19

[4 marks]

These statements are about the mean and range of the actual times.

Tick the correct box for each statement.

True

False

The mean could be less than 20 minutes

The mean could be more than 40 minutes

The mean could be less than 40 minutes

The range could be more than 40 minutes

The range could be less than 40 minutes

The range could be more than 60 minutes

The table shows information about the times for 10 people to complete a task.

Video created by W Neill

Time, t (minutes)	Frequency
$0 < t \leq 20$	1
$20 < t \leq 40$	6
$40 < t \leq 60$	3

[4 marks]

These statements are about the mean and range of the actual times.

Tick the correct box for each statement.

True

False

① The mean could be less than 20 minutes

② The mean could be more than 40 minutes

③ The mean could be less than 40 minutes

④ The range could be more than 40 minutes

⑤ The range could be less than 40 minutes

⑥ The range could be more than 60 minutes

p19

②) 6 people could be 40 min
3 people could be 60 min

③) 6 people could be 21 min
3 people could be 41 min

④) 1 min $\frac{1}{6}$ = 59 min
60 min

⑤) 19 min
41 min = 22 min

22 Here is some information about 20 trains leaving a station.

Number of minutes late, t	Number of trains	Midpoint	
$0 \leq t < 5$	12		
$5 \leq t < 10$	7		
$10 \leq t < 15$	1		
$t \geq 15$	0		

22 (a) Work out an estimate of the mean number of minutes late. [3 marks]

P19

Answer _____ minutes

22

Here is some information about 20 trains leaving a station.

Number of minutes late, t	Number of trains	Midpoint	
$0 \leq t < 5$	12	X 2.5	30
$5 \leq t < 10$	7	X 7.5	52.5
$10 \leq t < 15$	1	X 12.5	12.5
$t \geq 15$	0		

$\frac{20}{95}$

- (a) Work out an estimate of the mean number of minutes late. [3 marks]

P19

$$\frac{95}{20} =$$

Answer 4.75 minutes

(b) The station manager looks at the information in more detail.

P19

Number of minutes late, t	Number of trains
$0 \leq t < 2$	12
$2 \leq t < 4$	0
$4 \leq t < 6$	7
$6 \leq t < 8$	0
$8 \leq t < 10$	0
$10 \leq t < 12$	1

He works out an estimate of the mean using this information.

How does his estimate compare with the answer to part (a)?

Tick **one** box. [1 mark]

Higher than part (a)

Same as part (a)

Lower than part (a)

Not possible to tell

(b) The station manager looks at the information in more detail.

P19

Number of minutes late, t	Number of trains
$0 \leq t < 2$	1 x 12
$2 \leq t < 4$	0
$4 \leq t < 6$	5 x 7
$6 \leq t < 8$	7 x 0
$8 \leq t < 10$	0
$10 \leq t < 12$	11 x 1

He works out an estimate of the mean using this information.

How does his estimate compare with the answer to part (a)?

Tick **one** box.

[1 mark]

Higher than part (a)

Same as part (a)

Lower than part (a)

Not possible to tell

$$\frac{58}{20} = 2.9 \text{ min}$$

$$\frac{11}{20} = 0.55$$

$$\frac{11}{58} \approx 0.19$$

- 8 The table shows information about the distances walked by 120 students on their way to school one week.

P19

Distance, x (miles)	Frequency		
$0 < x \leq 5$	20		
$5 < x \leq 10$	48		
$10 < x \leq 15$	30		
$15 < x \leq 20$	22		
	Total = 120		

Work out an estimate for the mean distance.

[3 marks]

Answer _____ miles

- 8 The table shows information about the distances walked by 120 students on their way to school one week.

P19

Distance, x (miles)	Frequency	MP	
$0 < x \leq 5$	20	$\times 2.5$	50
$5 < x \leq 10$	48	$\times 7.5$	360
$10 < x \leq 15$	30	$\times 12.5$	375
$15 < x \leq 20$	22	$\times 17.5$	385
	Total = 120		1170

Work out an estimate for the mean distance.

[3 marks]

$$\frac{1170}{120}$$

Answer 9.75 ✓ miles

7 Here is some information about the times taken by 40 people to fill in a form.

P19

Time, t minutes	Number of people
$0 < t \leq 5$	3
$5 < t \leq 10$	9
$10 < t \leq 15$	11
$15 < t \leq 20$	17

In which class interval is the median?

Circle your answer.

[1 mark]

$0 < t \leq 5$

$5 < t \leq 10$

$10 < t \leq 15$

$15 < t \leq 20$

7

Here is some information about the times taken by 40 people to fill in a form.

P19

Time, t minutes	Number of people
$0 < t \leq 5$	3
$5 < t \leq 10$	9
$10 < t \leq 15$	11
$15 < t \leq 20$	17

40^{th}
people

$$\frac{40+1}{2} = 20.5^{\text{th}}$$

middle person = 20^{th}

In which class interval is the median?

Circle your answer.

[1 mark]

 $0 < t \leq 5$ $5 < t \leq 10$ $10 < t \leq 15$ $15 < t \leq 20$