

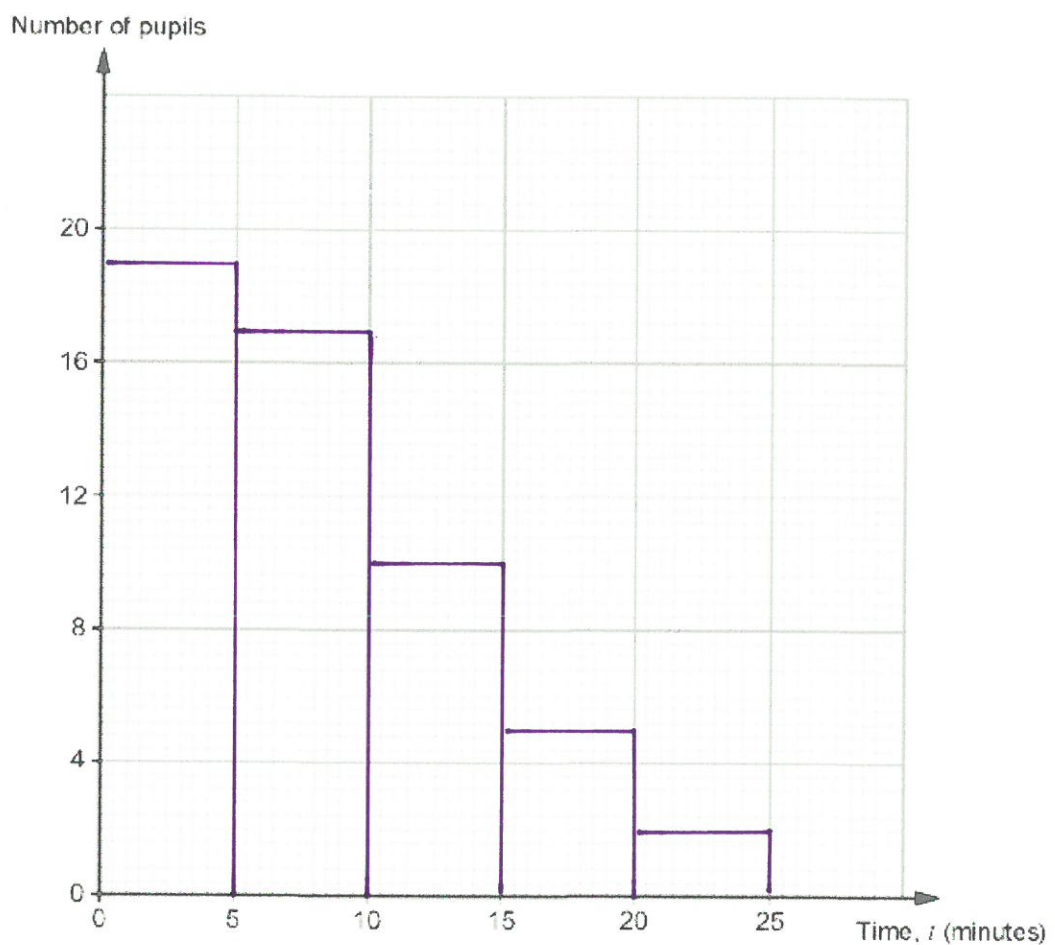
## Estimating the Mean Past Paper Questions

1. A group of pupils was timed in completing a maths test. The results are shown in the grouped frequency table below.

Time, $t$ (minutes)	Number of pupils	
$0 < t \leq 5$	19	$\times 2.5 = 47.5$
$5 < t \leq 10$	17	$\times 7.5 = 127.5$
$10 < t \leq 15$	10	$\times 12.5 = 125$
$15 < t \leq 20$	5	$\times 17.5 = 87.5$
$20 < t \leq 25$	2	$\times 22.5 = 45$
		<u>Total</u> <u>432.5</u>

*MID VALUE*

- (a) Draw a grouped frequency diagram to illustrate these results. [2]





(b) Calculate an estimate of the mean time taken to complete the test

[4]

There are  $19 + 17 + 10 + 5 + 2 = 53$  pupils

$$\begin{aligned}\text{Mean} &= \frac{\text{Total}}{\text{Count}} = \frac{432.5}{53} \\ &= 8.2 \text{ minutes}\end{aligned}$$

(c) Write down the modal group.

[1]

$$0 < t \leq 5$$

2.

(a) A broadcasting company, Stateside3, investigated television-viewing habits

The table below shows the number of minutes  $\textcircled{80}$  people spent watching television last Wednesday.

Time ( $t$ minutes)	Frequency	MID VALUE
$0 \leq t < 90$	10	$\times 45 = 450$
$90 \leq t < 180$	38	$\times 135 = 5130$
$180 \leq t < 270$	20	$\times 225 = 4500$
$270 \leq t < 450$	8	$\times 360 = 2880$
$450 \leq t < 810$	4	$\times 630 = 2520$
		Total 15480

(i) Did any of these people spend longer than 15 hours watching television last Wednesday?

Give a reason for your answer.

[1]

$$15 \text{ hours} = 15 \times 60 = 900 \text{ minutes}$$

Nobody spent more than 810 minutes

(ii) Calculate an estimate for the mean time these people spent watching television last Wednesday.

[4]

There are 80 people

$$\text{Mean} = \frac{\text{Total}}{\text{Count}} = \frac{15480}{80}$$

$$= 193.5 \text{ minutes}$$



3. (a) (i) When visiting a hat shop, customers had the circumference of their head measured. The table shows the results for the customers who bought a hat during December.

Head circumference, $c$ cm	MID	Number of customers		
$50 \leq c < 54$	52	x	12	= 624
$54 \leq c < 58$	56	x	32	= 1792
$58 \leq c < 62$	60	x	14	= 840
$62 \leq c < 66$	64	x	2	= 128

Total 3384

Calculate an estimate for the mean head circumference.

There are  $12 + 32 + 14 + 2 = 60$  customers

$$\text{Mean} = \frac{\text{Total}}{\text{Count}} = \frac{3384}{60} = 56.4 \text{ cm}$$

[4]

- (ii) The hat shop sells 4 different sizes of hats. The conversion table from head circumference to hat size is shown below.

Head circumference, $c$ cm	Hat size
$50 \leq c < 54$	1
$54 \leq c < 58$	2
$58 \leq c < 62$	3
$62 \leq c < 66$	4

A salesman places an order for new stock for the hat shop.

The salesman's order form shows that about half of the hats ordered are size 2.

The owner of the shop says the order should show that about a quarter of the hats ordered are size 2.

Who is more likely to be correct, the salesman or the owner of the shop?

You must give a reason for your answer.

The salesman is most likely to be correct as  $\frac{32}{60}$  heads relate to a size 2 hat.

[2]





4. (a) In the mountains of Aplen grub, the snowfall on each of 28 days was measured. The results are summarised in the table below.

Daily snowfall, $s$ (cm)	Mid	Number of days	
$5 \leq s < 15$	10	$\times$	$5 = 50$
$15 \leq s < 25$	20	$\times$	$10 = 200$
$25 \leq s < 35$	30	$\times$	$12 = 360$
$35 \leq s < 45$	40	$\times$	$1 = 40$
		Total <u>650</u> +	

- (i) Calculate an estimate for the mean daily snowfall for the 28 days [4]

There are 28 days

$$\text{Mean} = 650 \div 28 = 23.2 \text{ cm}$$


- (ii) State the modal class. [1]

Modal class  $25 \leq s < 35$

- (iii) Write down the class in which the median lies. [1]

Median class  $15 \leq s < 25$

- (b) In the mountains of Terragal, the data collected on snowfall, over the same 28 days, was as follows.

<p>Terragal</p>  <p>Mean daily snowfall 20 cm Median daily snowfall 9 cm</p>
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Ralph was on holiday in Terragal for these 28 days.

He does not understand how the mean snowfall could be as high as 20 cm.

Ralph says,

'On about half of the days there was less than 10 cm of snowfall each day.'

Write a brief explanation to help Ralph understand how it is possible to have a mean of 20 cm with a median of 9 cm. [1]

There could be some days which had very heavy snowfall which would make the mean higher than the median

