

MATHSDIY

Note

If your table contains grouped data, you need to find the **midpoint** of each interval first. This is then your 'x'.

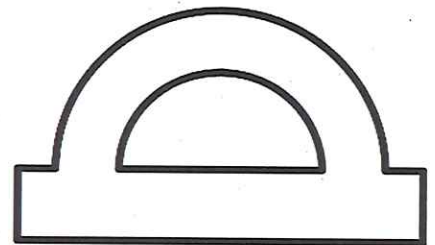
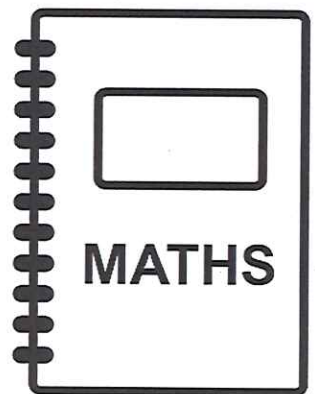
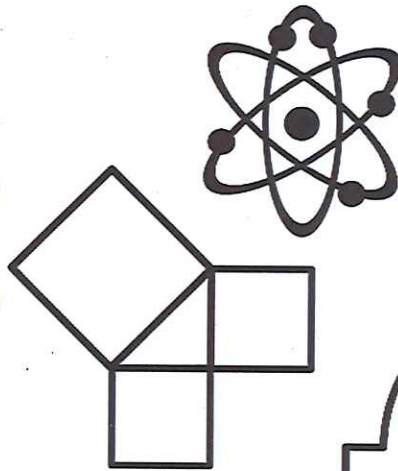
Solutions

GCSE TOPIC BOOKLET MEAN FROM A FREQUENCY DISTRIBUTION

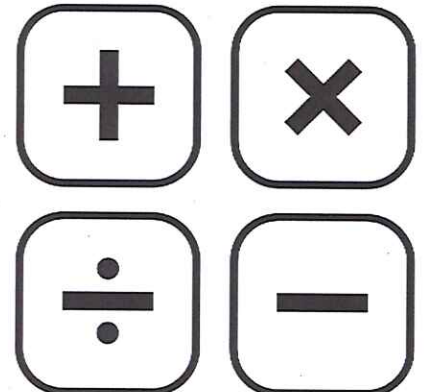
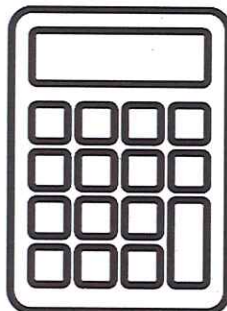
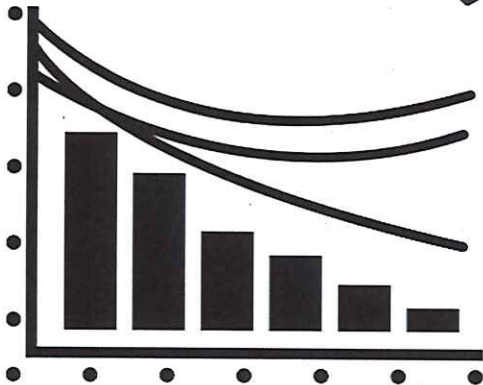
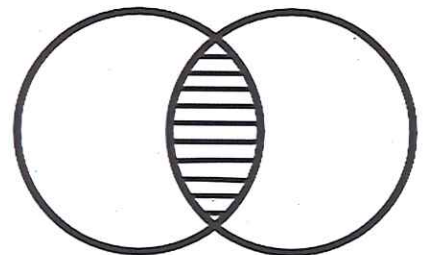
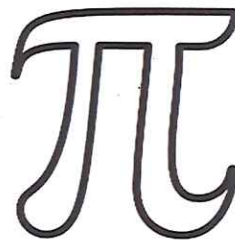
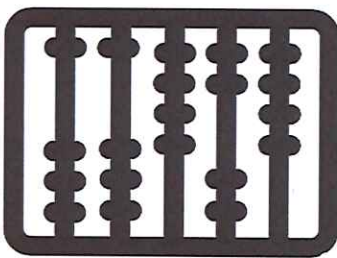
$$\text{Mean} = \frac{\sum fx}{\sum f}$$

$\sum f$ = the sum of all the frequencies

$\sum fx$ = the product of the value 'x' by the number of times it occurs.



$$a^2 = b^2 + c^2$$



1. In a particular street of 50 houses, a survey of the number of pets in each house was carried out. The following frequency distribution was obtained.

Number of pets per house x	Number of houses f
0	15
1	13
2	10
3	8
4	2
5	2

$$fx$$

$$15 \times 0 = 0$$

$$13 \times 1 = 13$$

$$10 \times 2 = 20$$

$$8 \times 3 = 24$$

$$2 \times 4 = 8$$

$$2 \times 5 = 10$$

Calculate the mean number of pets per house.

$$\sum f = 50$$

$$\sum fx = 75$$

$$\text{Mean} = \frac{75}{50} = 1.5$$

$$\left(= \frac{\sum fx}{\sum f} \right)$$

but you don't have
to use this
formula [3]

2. The duration, in minutes, of each of 150 phone calls was recorded. The table shows a grouped frequency distribution of the results.

midpoint
x

Duration of phone call in minutes (t)		Number of phone calls f	fx
$0 < t \leq 5$	2.5	36	$36 \times 2.5 = 90$
$5 < t \leq 10$	7.5	58	$58 \times 7.5 = 435$
$10 < t \leq 15$	12.5	26	$26 \times 12.5 = 325$
$15 < t \leq 20$	17.5	18	$18 \times 17.5 = 315$
$20 < t \leq 25$	22.5	10	$10 \times 22.5 = 225$
$25 < t \leq 30$	27.5	2	$2 \times 27.5 = 55$

$$\sum f = 150$$

$$\sum fx = 1445$$

Find an estimate for the mean duration of a phone call.

$$\text{Mean} = \frac{\sum fx}{\sum f} = \frac{1445}{150}$$

$$= 9.63 \text{ minutes}$$

[4]

3.

The heights of 107 Christmas trees were measured to the nearest centimetre. The table below shows a grouped frequency distribution of the heights.

Midpoint ('x')

Height (h centimetres)		Number of Christmas trees f	fx
$191 \leq h \leq 197$	194	24	$24 \times 194 = 4656$
$198 \leq h \leq 204$	201	35	$35 \times 201 = 7035$
$205 \leq h \leq 211$	208	28	$28 \times 208 = 5824$
$212 \leq h \leq 218$	215	20	$20 \times 215 = 4300$
		$\Sigma f = 107$	$\Sigma fx = 21,815$

Find an estimate for the mean height of the Christmas trees.

$$\begin{aligned} \text{Mean} &= \frac{\Sigma fx}{\Sigma f} = 203.878 \dots \\ &= \underline{\underline{203.9 \text{ cm}}} \quad (1 \text{ dp}) \end{aligned}$$

[4]

4. The times taken, by customer service advisers, to answer 50 phone calls were recorded to the nearest second. The table shows a grouped frequency distribution of this information.

Midpoint (x)

Time, t (seconds)		Number of phone calls f	fx
$1 \leq t \leq 5$	3	12	$12 \times 3 = 36$
$6 \leq t \leq 10$	8	30	$30 \times 8 = 240$
$11 \leq t \leq 15$	13	8	$8 \times 13 = 104$
		$\Sigma f = 50$	$\Sigma fx = 380$

Find an estimate for the mean time taken to answer these phone calls.

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f} = \frac{380}{50} = \underline{\underline{7.6 \text{ seconds}}}$$

[4]

5. The heights of 80 people were measured to the nearest centimetre. The table below shows a grouped frequency distribution of the heights.

↗ midpoints

Height (h centimetres)	x	f Number of people	fx
$151 \leq h \leq 157$	154	18	$154 \times 18 = 2772$
$158 \leq h \leq 164$	161	37	$161 \times 37 = 5957$
$165 \leq h \leq 171$	168	25	$168 \times 25 = 4200$

Find an estimate for the mean height of these people.

$$\Sigma f = 80$$

$$\Sigma fx = 12,929$$

$$\text{Mean} = \frac{12929}{80} = 161.6125$$

$$= \underline{161.6 \text{ cm}} \text{ (1dp)}$$

[4]

6. The number of days taken to germinate 60 seeds was recorded. The table shows a grouped frequency distribution of this information.

Time, d days	x (midpoint)	f (Number of seeds)	fx
$1 \leq d \leq 7$	4	15	$4 \times 15 = 60$
$8 \leq d \leq 14$	11	33	$11 \times 33 = 363$
$15 \leq d \leq 21$	18	12	$18 \times 12 = 216$

Find an estimate for the mean time taken for a seed to germinate.

$$\sum f = 60$$

$$\sum fx = 639$$

$$\text{Mean} = \frac{\sum fx}{\sum f} = \frac{639}{60}$$

$$= 10.65 \text{ days}$$

[4]

7.

In Summerfield, the rainfall for each of 30 days was measured. The results are summarised in the table below.

Daily rainfall, r , in cm	x <i>Midpoint</i>	Number of days f
$0.5 \leq r < 1.5$	1	5
$1.5 \leq r < 2.5$	2	11
$2.5 \leq r < 3.5$	3	13
$3.5 \leq r < 4.5$	4	1

fx

$$5 \times 1 = 5$$

$$11 \times 2 = 22$$

$$13 \times 3 = 39$$

$$1 \times 4 = 4$$

$$\sum f = 30$$

$$\sum fx = 70$$

Calculate an estimate for the mean daily rainfall for the 30 days.

[4]

$$\begin{aligned} \text{Mean} &= \frac{\sum fx}{\sum f} = \frac{70}{30} \\ &= 2.3 \\ &= \underline{\underline{2.3 \text{ cm (1dp)}}} \end{aligned}$$