AVERAGES FROM TABLES

1) The number of goals scored in a football match are shown in the table below. Work out the total number of goals scored.

Goals	Frequency
0	4
1	5
2	3
3	6

$Total = (0 \times 4) + (1 \times 5) + (2 \times 3) + (3 \times 6)$
$= 0 + 5 + 6 + 18$
$= \mathbf{29}$

2) The number of goals a team scored in a season are shown in the frequency table below.

Goals	Frequency
0	1
1	2
2	3
3	4

a. Work out the mean number of points per game.

$$Mean = \frac{(0 \times 1) + (1 \times 2) + (2 \times 3) + (3 \times 4)}{1 + 2 + 3 + 4} = \frac{20}{10} = \mathbf{2}$$

b. What was the modal number of goals scored? **3**

3) The table shows the shoe sizes of customers in a shoe store.

Shoe Size	Frequency
4	2
5	5
6	8
7	6
8	4

a. Work out the average shoe size.

$$Mean = \frac{(4 \times 2) + (5 \times 5) + (6 \times 8) + (7 \times 6) + (8 \times 4)}{2 + 5 + 8 + 6 + 4} = \frac{155}{25} = \mathbf{6.2}$$

b. Work out the modal shoe size. **6**

4) A survey asked people how many siblings they have. The results are shown in the frequency table below.

Siblings	Frequency
0	3
1	7
2	10
3	5
4	2

a. Work out the percentage of people with less than 2 siblings. Give your answer to the nearest percentage.

$$\frac{3+7}{3+7+10+5+2} \times 100 = 37.037\ldots$$

37%

b. Work out the mean number of siblings. Give your answer to the nearest integer.

$$Mean = \frac{(0\times 3)+(1\times 7)+(2\times 10)+(3\times 5)+(4\times 2)}{3+7+10+5+2}$$

$$= \frac{50}{27}$$

$$= 1.851\ldots$$

$$= \mathbf{2}$$

c. Work out the median number of siblings.

$$Median\ position = \frac{27+1}{2} = 14$$

Siblings	Frequency	Cumulative Frequency	People Represented
0	3	3	1 – 3
1	7	10	4 – 10
2	10	20	11 – 20
3	5	25	21 – 25
4	2	27	26 – 27

Median number of siblings = **2**

5) A total of 23 people signed up for a free TV trial. The frequency table below shows the number of hours of TV they watched during the trial period.

Hours of TV Watched	Frequency
$0 < h \leq 5$	2
$5 < h \leq 10$	6
$10 < h \leq 15$	8
$15 < h \leq 20$	4
$20 < h \leq 25$	3

a. How many people watched more than 10 hours of TV?

8 + 4 + 3 = **15 people**

b. What fraction of the people watched more than 15 hours of TV?

$$\frac{4+3}{23}$$

$$= \frac{\mathbf{7}}{\mathbf{23}}$$

c. Estimate the mean number of hours of TV watched.

Midpoint	Hours of TV Watched	Frequency	fx
2.5	$0 < h \leq 5$	2	2.5 × 2 = 5
7.5	$5 < h \leq 10$	6	7.5 × 6 = 45
12.5	$10 < h \leq 15$	8	12.5 × 8 = 100
17.5	$15 < h \leq 20$	4	17.5 × 4 = 70
22.5	$20 < h \leq 25$	3	22.5 × 3 = 67.5

$$Mean = \frac{5 + 45 + 100 + 70 + 67.5}{2 + 6 + 8 + 4 + 3}$$

$$= \frac{287.5}{23}$$

$$= \mathbf{12.5}$$

d. Explain why your answer to part c is an estimate.
We are using grouped data. We do not know the exact number of hours watched.

6) 35 students were asked how many hours they spend playing video games in a week. The results are shown in the frequency table below.

Hours of Gaming	Frequency
$0 < h \leq 4$	8
$4 < h \leq 8$	12
$8 < h \leq 12$	6
$12 < h \leq 16$	4
$16 < h \leq 20$	5

a. State the modal class interval. **$4 < h \leq 8$**

b. Work out an estimate for the mean number of hours spent gaming.

Midpoint	Hours of Gaming	Frequency	fx
2	$0 < h \leq 4$	8	2 × 8 = 16
6	$4 < h \leq 8$	12	6 × 12 = 72
10	$8 < h \leq 12$	6	10 × 6 = 60
14	$12 < h \leq 16$	4	14 × 4 = 56
18	$16 < h \leq 20$	5	18 × 5 = 90

$$Mean = \frac{16 + 72 + 60 + 56 + 90}{8 + 12 + 6 + 4 + 5} = \frac{294}{35} = \mathbf{8.4}$$

c. State the class interval that contains the median number of hours of gaming.

$$Median\ position = \frac{35+1}{2} = 18$$

$$\mathbf{4 < h \leq 8}$$

7) The table shows the number of books read by 25 pupils last year.

Number of Books Read	Frequency
0 < b ≤ 3	6
3 < b ≤ 6	9
6 < b ≤ 9	5
9 < b ≤ 12	3
12 < b ≤ 15	2

a. State the modal class interval. $\mathbf{3 < b \leq 6}$

b. State the class interval that contains the median number of books read.

$$Median\ position = \frac{25+1}{2} = 13$$

$$\mathbf{3 < b \leq 6}$$

c. Estimate the mean number of books read. Give your answer to the nearest unit.

Midpoint	Number of Books Read	Frequency	fx
1.5	0 < b ≤ 3	6	1.5 × 6 = 9
4.5	3 < b ≤ 6	9	4.5 × 9 = 40.5
7.5	6 < b ≤ 9	5	7.5 × 5 = 37.5
10.5	9 < b ≤ 12	3	10.5 × 3 = 31.5
13.5	12 < b ≤ 15	2	13.5 × 2 = 27

$$Mean = \frac{9 + 40.5 + 37.5 + 31.5 + 27}{25}$$
$$= \frac{145.5}{25}$$
$$= 5.82$$
$$= \mathbf{6\ books\ (unit)}$$

d. Explain why your answer to part c is an estimate.

We are using grouped data. We do not know the exact number of books each person read.

8) 100 people travel to an event. The distance they travelled is shown in the table below in kilometres.

Distance Travelled (km)	Frequency
$0 < d \leq 1.5$	14
$1.5 < d \leq 2.5$	25
$2.5 < d \leq 3.5$	28
$3.5 < d \leq 4.5$	11
$4.5 < d \leq 5.5$	8
$5.5 < d \leq 6.5$	14

a. State the modal class interval. $\mathbf{2.5 < d \leq 3.5}$

b. State the class interval that contains the median distance travelled.

$$Median\ position = \frac{100+1}{2} = 50.5$$

$$\mathbf{2.5 < d \leq 3.5}$$

c. Estimate the mean distance travelled.

Midpoint	Distance Travelled (km)	Frequency	fx
0.75	$0 < d \leq 1.5$	14	0.75 × 14 = 10.5
2	$1.5 < d \leq 2.5$	25	2 × 25 = 50
3	$2.5 < d \leq 3.5$	28	3 × 28 = 84
4	$3.5 < d \leq 4.5$	11	4 × 11 = 44
5	$4.5 < d \leq 5.5$	8	5 × 8 = 40
6	$5.5 < d \leq 6.5$	14	6 × 14 = 84

$$Mean = \frac{10.5 + 50 + 84 + 44 + 40 + 84}{100}$$
$$= \frac{312.5}{100}$$
$$= \mathbf{3.125\ km}$$

d. Explain why your answer to part c is an estimate.

We are using grouped data. We do not know the exact distance travelled.

9) A survey was given on how many hours of TV people watched this week. The results are shown in the frequency table below.

Hours	Frequency
0 – 5	6
6 – 10	4
11 – 15	5
16 – 20	x

Bob correctly estimated that the mean number of hours watched was 8.125
Work out the value of x.

Midpoint	Hours	Frequency	Fx
2.5	0 – 5	6	2.5 × 6 = 15
8	6 – 10	4	8 × 4 = 32
13	11 – 15	5	13 × 5 = 65
18	16 – 20	x	18x

$$\frac{15 + 32 + 65 + 18x}{6 + 4 + 5 + x} = 8.125$$

$$\frac{18x + 112}{x + 15} = 8.125$$

$$18x + 112 = 8.125(x + 15)$$

$$18x + 112 = 8.125x + 121.875$$

$$9.875x = 9.875$$

$$\boldsymbol{x = 1}$$

10) The table shows the number of pets owned per household.

Number of Pets	Frequency
0	7
1	10
2	2x
3	x
4	3

The mean number of pets per household is 1.5625.
Work out the value of x.

$$\frac{(0 \times 7) + (1 \times 10) + (2 \times 2x) + 3x + (4 \times 3)}{7 + 10 + 2x + x + 3} = 1.5625$$

$$\frac{7x + 22}{3x + 20} = 1.5625$$

$$7x + 22 = 1.5625(3x + 20)$$

$$7x + 22 = 4.6875x + 31.25$$

$$2.3125x = 9.25$$

$$\boldsymbol{x = 4}$$