

Estimated Mean: Grouped Frequency Tables

1

Estimate the mean.

Time, t (min)	Frequency	Midpoint	$f \times x$
$0 < t \leq 10$	4	5	20
$10 < t \leq 20$	6	15	90
$20 < t \leq 30$	8	25	200
$30 < t \leq 40$	2	35	70
Total	20		380

$$\text{Mean} \approx \frac{380}{20}$$

Estimated mean 19 min

2

Estimate the mean.

Height, h (cm)	Frequency	Midpoint	$f \times x$
$0 < h \leq 10$	5	5	25
$10 < h \leq 20$	10	15	150
$20 < h \leq 30$	3	25	75
$30 < h \leq 40$	2	35	70
Total	20		320

$$\text{Mean} \approx \frac{320}{20}$$

Estimated mean 16 cm

3

Estimate the mean.

Mass, m (kg)	Frequency	Midpoint	$f \times x$
$0 < m \leq 20$	2	10	20
$20 < m \leq 40$	8	30	240
$40 < m \leq 60$	6	50	300
$60 < m \leq 80$	4	70	280
Total	20		840

$$\text{Mean} \approx \frac{840}{20}$$

Estimated mean 42 kg

4

Estimate the mean.

Length, l (cm)	Frequency	Midpoint	$f \times x$
$0 < l \leq 10$	3	5	15
$10 < l \leq 20$	7	15	105
$20 < l \leq 30$	6	25	150
$30 < l \leq 40$	4	35	140
Total	20		410

$$\text{Mean} \approx \frac{410}{20}$$

Estimated mean 20.5 cm

5

Estimate the mean.

Age, a (years)	Frequency	Midpoint	$f \times x$
$10 < a \leq 20$	6	15	90
$20 < a \leq 30$	9	25	225
$30 < a \leq 40$	3	35	105
$40 < a \leq 50$	2	45	90
Total	20		510

$$\text{Mean} \approx \frac{510}{20}$$

Estimated mean 25.5 years

6

Estimate the mean.

Distance, d (km)	Frequency	Midpoint	$f \times x$
$0 < d \leq 5$	4	2.5	10
$5 < d \leq 10$	8	7.5	60
$10 < d \leq 15$	6	12.5	75
$15 < d \leq 20$	2	17.5	35
Total	20		180

$$\text{Mean} \approx \frac{180}{20}$$

Estimated mean 9 km

7

Why is a mean worked out from a grouped frequency table only an estimate?

the midpoints stand in for the real values

Answer the data is grouped

8

The group $10 < l \leq 20$ has a frequency of 6. What total does the table use for this group?

midpoint 15×6

Answer 90

Estimated Mean: Grouped Frequency Tables *further practice*

9

The table shows how long 30 patients waited at a doctor's surgery. Estimate the mean waiting time.

Time, t (min)	Frequency	Midpoint	$f \times x$
$0 < t \leq 10$	5	5	25
$10 < t \leq 20$	12	15	180
$20 < t \leq 30$	9	25	225
$30 < t \leq 40$	4	35	140
Total	30		570

$$570 \div 30$$

Estimated mean 19 min

10

The table shows the ages of 40 visitors to a museum. Estimate the mean age, to 1 decimal place.

Age, a (years)	Frequency	Midpoint	$f \times x$
$0 < a \leq 10$	6	5	30
$10 < a \leq 20$	9	15	135
$20 < a \leq 40$	15	30	450
$40 < a \leq 80$	10	60	600
Total	40		1215

$$1215 \div 40 = 30.375$$

Estimated mean 30.4 years

11

The table shows the masses of 50 parcels. One frequency is missing. Estimate the mean mass.

Mass, m (kg)	Frequency	Midpoint	$f \times x$
$0 < m \leq 1$	8	0.5	4
$1 < m \leq 2$	19	1.5	28.5
$2 < m \leq 3$	14	2.5	35
$3 < m \leq 4$	9	3.5	31.5
Total	50		99

$$50 - 36 = 14, \text{ then } 99 \div 50$$

Estimated mean 1.98 kg

12

The table shows how long 25 customers queued at Café A. At Café B the estimated mean queuing time is 4.2 minutes. Which café has the shorter queue on average?

Time, t (min)	Frequency	Midpoint	$f \times x$
$0 < t \leq 2$	4	1	4
$2 < t \leq 4$	8	3	24
$4 < t \leq 6$	9	5	45
$6 < t \leq 8$	4	7	28
Total	25		101

$$101 \div 25 = 4.04, \text{ less than } 4.2$$

Answer Café A

13

The lengths, in cm, of 16 fish are 12, 25, 18, 33, 21, 27, 14, 38, 22, 29, 17, 24, 31, 26, 19, 23. Complete the table and estimate the mean length.

Length, l (cm)	Frequency	Midpoint	$f \times x$
$10 < l \leq 20$	5	15	75
$20 < l \leq 30$	8	25	200
$30 < l \leq 40$	3	35	105
Total	16		380

Estimated mean 23.75 cm

14

Zara estimates the mean distance 20 cyclists rode. She works out $(5 + 15 + 25 + 35) \div 4 = 20$. Explain her mistake and find a correct estimate.

Distance, d (km)	Frequency	Midpoint	$f \times x$
$0 < d \leq 10$	2	5	10
$10 < d \leq 20$	3	15	45
$20 < d \leq 30$	9	25	225
$30 < d \leq 40$	6	35	210
Total	20		490

she has ignored the frequencies

Estimate 24.5 km

15

A van can carry 600 kg. The table shows the masses of 40 boxes. Estimate the total mass of the boxes. Is the van likely to carry them all in one trip?

Mass, m (kg)	Frequency	Midpoint	$f \times x$
$0 < m \leq 10$	12	5	60
$10 < m \leq 20$	15	15	225
$20 < m \leq 30$	10	25	250
$30 < m \leq 40$	3	35	105
Total	40		640

about 640 kg, over 600 kg

Answer Probably not

16

The table shows the times 20 students took to finish a puzzle. Ravi says the actual mean time could be 26 minutes. Is he right? Explain.

Time, t (min)	Frequency
$10 < t \leq 20$	12
$20 < t \leq 30$	8
Total	20

at most $(12 \times 20 + 8 \times 30) \div 20 = 24$

Answer No