Estimated Mean from a Grouped Table

ANSWERS

1

The table shows how long 20 customers queued at a post office.
Estimate the mean time.

Time, t (min)	Frequency	Midpoint	Midpoint × frequency
$0 < t \leq 10$	3	5	15
$10 < t \leq 20$	8	15	120
$20 < t \leq 30$	6	25	150
$30 < t \leq 40$	3	35	105
Total	20		390

Estimated mean = 390 ÷ 20

Estimated mean 19.5 minutes

2

The table shows the masses of 25 parcels at a sorting office. Estimate the mean mass.

Mass, m (kg)	Frequency	Midpoint	Midpoint × frequency
$0 < m \leq 2$	4	1	4
$2 < m \leq 4$	9	3	27
$4 < m \leq 6$	7	5	35
$6 < m \leq 8$	5	7	35
Total	25		101

Estimated mean = 101 ÷ 25

Estimated mean 4.04 kg

3

The table shows the ages of 40 people at a climbing wall. Estimate the mean age.

Age, a (years)	Frequency	Midpoint	Midpoint × frequency
$10 < a \leq 20$	12	15	180
$20 < a \leq 30$	15	25	375
$30 < a \leq 40$	9	35	315
$40 < a \leq 50$	4	45	180
Total	40		1050

Estimated mean = 1050 ÷ 40

Estimated mean 26.25 years

4

The table shows the speeds of 50 cars on a village road. Estimate the mean speed.

Speed, s (mph)	Frequency	Midpoint	Midpoint × frequency
$15 < s \leq 20$	6	17.5	105
$20 < s \leq 25$	19	22.5	427.5
$25 < s \leq 30$	17	27.5	467.5
$30 < s \leq 35$	8	32.5	260
Total	50		1260

1260 ÷ 50 = 25.2

Estimated mean 25.2 mph

5

The table shows the times 35 students took to solve a puzzle.

(a) Write down the modal class.
(b) Which class contains the median?

Time, t (s)	Frequency	Running total
$0 < t \leq 30$	4	4
$30 < t \leq 60$	9	13
$60 < t \leq 90$	8	21
$90 < t \leq 120$	14	35

the 18th value

(a) $90 < t \leq 120$

(b) $60 < t \leq 90$

6

The table shows the rainfall on each of the 30 days in June. Estimate the mean daily rainfall, to 1 decimal place.

Rainfall, r (mm)	Frequency	Midpoint	Midpoint × frequency
$0 < r \leq 2$	12	1	12
$2 < r \leq 5$	8	3.5	28
$5 < r \leq 10$	6	7.5	45
$10 < r \leq 20$	4	15	60
Total	30		145

145 ÷ 30 = 4.833...

Estimated mean 4.8 mm

7

A table of journey times has the classes $10 < t \leq 20$ and $20 < t \leq 30$ (minutes).

(a) Write down a time that is in the class $20 < t \leq 30$.
(b) Leo's journey took exactly 20 minutes. Which class is it in?
(c) Why is a mean worked out from a grouped table only an estimate?

(a) 25 minutes (any time over 20, up to 30)

(b) $10 < t \leq 20$

(c) the midpoints stand in for the real times

8

Mia estimates the mean time 20 students spent on homework. She works out 580 ÷ 3 = 193.3. Explain her mistake and find a correct estimate.

Time, t (min)	Frequency	Midpoint	Midpoint × frequency
$0 < t \leq 20$	6	10	60
$20 < t \leq 40$	9	30	270
$40 < t \leq 60$	5	50	250
Total	20		580

she divided by 3 classes, not 20 students

Estimate 580 ÷ 20 = 29 minutes

Estimated Mean from a Grouped Table *further practice*

ANSWERS

9

The table shows how long 45 phone batteries lasted. Estimate the mean time, to 1 decimal place.

Time, h (hours)	Frequency	Midpoint	Midpoint × frequency
$0 < h \leq 4$	5	2	10
$4 < h \leq 8$	14	6	84
$8 < h \leq 12$	18	10	180
$12 < h \leq 16$	8	14	112
Total	45		386

386 ÷ 45 = 8.577...

Estimated mean 8.6 hours

10

27 newborn lambs were weighed.

(a) Estimate the mean, to 1 decimal place.
(b) Write down the modal class.
(c) Which class contains the median?

Mass, m (kg)	Frequency	Midpoint	Midpoint × frequency
$2 < m \leq 3$	3	2.5	7.5
$3 < m \leq 4$	10	3.5	35
$4 < m \leq 5$	6	4.5	27
$5 < m \leq 6$	8	5.5	44
Total	27		113.5

(a) 113.5 ÷ 27 = 4.2 kg

(b) $3 < m \leq 4$ **(c)** $4 < m \leq 5$

11

One frequency is missing from this table of worm lengths.

(a) Find the missing frequency.
(b) Estimate the mean, to 1 decimal place.

Length, l (cm)	Frequency	Midpoint	Midpoint × frequency
$0 < l \leq 10$	6	5	30
$10 < l \leq 20$	14	15	210
$20 < l \leq 30$	4	25	100
Total	24		340

340 − 30 − 100 = 210

(a) 210 ÷ 15 = 14

(b) 340 ÷ 24 = 14.2 cm

12

A gym says its members' mean workout lasts over 45 minutes. The table shows 25 workouts. Is the gym right? Explain.

Time, t (min)	Frequency	Midpoint	Midpoint × frequency
$0 < t \leq 30$	8	15	120
$30 < t \leq 60$	14	45	630
$60 < t \leq 90$	3	75	225
Total	25		975

975 ÷ 25 = 39

Answer No, about 39 minutes

13

Ella timed 20 journeys, in minutes. Complete the table and estimate the mean.

12, 25, 30, 8, 17, 21, 10, 28, 33, 15, 20, 26, 38, 19, 24, 31, 14, 27, 22, 35

Time, t (min)	Frequency	Midpoint	Midpoint × frequency
$0 < t \leq 10$	2	5	10
$10 < t \leq 20$	6	15	90
$20 < t \leq 30$	8	25	200
$30 < t \leq 40$	4	35	140
Total	20		440

440 ÷ 20 = 22

Estimated mean 22 minutes

14

(a) A grouped table of 25 values has an estimated mean of 18.4. What is the total of its midpoint × frequency column?
(b) Another table's midpoint × frequency column adds up to 660. Its estimated mean is 16.5. How many values are in the table?

(a) 18.4 × 25 = 460

(b) 660 ÷ 16.5 = 40

15

Ana says the modal class is $20 < t \leq 30$, because it has the biggest midpoint × frequency. Is she right? Explain.

Time, t (min)	Frequency	Midpoint	Midpoint × frequency
$0 < t \leq 10$	9	5	45
$10 < t \leq 20$	12	15	180
$20 < t \leq 30$	8	25	200
$30 < t \leq 40$	5	35	175
Total	34		600

the highest frequency is 12

Answer No: $10 < t \leq 20$

16

The table shows how long 38 calls to a helpline lasted. Kai says the median is in the middle row, $10 < t \leq 15$. Is he right? Explain.

Time, t (min)	Frequency
$0 < t \leq 5$	14
$5 < t \leq 10$	11
$10 < t \leq 15$	6
$15 < t \leq 20$	4
$20 < t \leq 25$	3

19th and 20th: 14, then 25

Answer No: $5 < t \leq 10$