

Averages and the range

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Worked example

Calculate the mean of:

3, 4, 5

3, 4, 5, 6

3, 4, 5, 6, 7

3, 4, 5, 6, 7, 0

Your turn

Calculate the mean of:

2, 5, 7, 0, 1

3

Worked example

Calculate the mean of:

123, 45, 67, 8, 9

Your turn

Calculate the mean of:

987, 65, 43, 2, 1

219.6

Worked example

The mean of four numbers is 5.2
One of the numbers is 10
Find the mean of the other three numbers

Your turn

The mean of four numbers is 2.6
One of the numbers is 5
Find the mean of the other three numbers

1.8

Worked example

Four numbers have a mean of 9.
The first three are 2, 3, and 5.
What is the fourth number?

Your turn

Four numbers have a mean of 5.
The first three are 2, 3, and 9.
What is the fourth number?

6

Worked example

The mean score after six tests is 5. One more test is taken. After this test the mean score is 6. What was the score on the final test?

Your turn

The mean score after five tests is 6. One more test is taken. After this test the mean score is 7. What was the score on the final test?

12

Worked example

The mean score after six tests is 5. One more test is taken. After this test the mean score is 6. What was the score on the final test?

Your turn

The mean score after five tests is 6. One more test is taken. After this test the mean score is 5. What was the score on the final test?

0

Worked example

The mean of five numbers is 8.
Three of the numbers are chosen
and the mean is found to be 5.
What is the mean of the
remaining two numbers?

Your turn

The mean of five numbers is 6.
Three of the numbers are chosen
and the mean is found to be 8.
What is the mean of the
remaining two numbers?

3

Worked example

The mean height of 20 players is 164 *cm*. A player with a height of 152 *cm* leaves the team.

What is the new mean height of the team?

Your turn

The mean height of 20 players is 146 *cm*. A player with a height of 125 *cm* leaves the team.

What is the new mean height of the team?

147.1 *cm* (1 dp)

Worked example

The mean height of 14 players is 172 cm . A player with a height of 197 cm leaves the team.

What is the new mean height of the team?

Your turn

The mean height of 14 players is 127 cm . A player with a height of 142 cm leaves the team.

What is the new mean height of the team?

125.8 cm (1 dp)

Worked example

A group of students take a test.
The group consists of 24 boys and 16 girls.
The mean mark for the boys is 36.
The mean mark for the girls is 33.
Calculate the mean mark for the whole group

Your turn

A group of students take a test.
The group consists of 12 boys and 8 girls.
The mean mark for the boys is 18.
The mean mark for the girls is 16.5.
Calculate the mean mark for the whole group

17.4

Worked example

A group of men, women and children take a test.

The mean score for women is 31.2

The mean score for children is 18.4

The mean score for all 80 people is 22.4.

Work out the mean score for men

Your turn

A group of men, women and children take a test.

The mean score for women is 15.6

The mean score for children is 9.2

The mean score for all 40 people is 11.2.

Work out the mean score for men

10

Worked example

Find the mean of these expressions:

$$\begin{array}{c}x \\ x + 3 \\ x + 5 \\ x + 7 \\ x + 10\end{array}$$

Your turn

Find the mean of these expressions:

$$\begin{array}{c}x \\ x + 7 \\ x + 9 \\ x + 11 \\ x + 8 \\ x + 1 \\ x + 6\end{array}$$

Worked example

Calculate the mean score

Score	Frequency
0	2
1	3
2	1
3	2
4	2
5	4

Your turn

Calculate the mean score

Score	Frequency
0	4
1	6
2	2
3	4
4	4
5	8

2.8 (1 dp)

Worked example

Calculate the mean age

Age	Frequency
6	5
7	3
8	2
9	7

Your turn

Calculate the mean age

Age	Frequency
6	10
7	6
8	4
9	14

7.6 (1 dp)

Worked example

The mean score was 3. Find x

Score	Frequency
0	2
1	3
2	1
3	2
4	x
5	5

Your turn

The mean score was 2.5. Find x

Score	Frequency
0	4
1	6
2	x
3	4
4	6
5	8

$$x = 24$$

Worked example

Calculate an estimate for the mean mass:

Mass, x (kg)	Frequency
$0 < x \leq 10$	5
$10 < x \leq 20$	3
$20 < x \leq 40$	2
$40 < x \leq 46$	6
$46 < x \leq 50$	4

Your turn

Calculate an estimate for the mean mass:

Mass, x (kg)	Frequency
$0 < x \leq 10$	10
$10 < x \leq 20$	6
$20 < x \leq 40$	4
$40 < x \leq 46$	12
$46 < x \leq 50$	8

29 kg

Worked example

Calculate an estimate for the mean mass:

Mass, x (kg)	Frequency
$0 < x \leq 10$	5
$10 < x \leq 20$	3
$20 < x \leq 40$	2
$40 < x \leq 46$	6
$46 < x \leq 50$	4

Your turn

Calculate an estimate for the mean mass:

Mass, x (kg)	Frequency
$0 < x \leq 10$	5
$10 < x \leq 20$	3
$20 < x \leq 40$	0
$40 < x \leq 46$	6
$46 < x \leq 50$	4

28.9 kg (1 dp)

Worked example

Calculate an estimate for the mean mass:

Mass, x (kg)	Frequency
$0 < x \leq 10$	5
$10 < x \leq 20$	3
$20 < x \leq 40$	2
$40 < x \leq 46$	6
$46 < x \leq 50$	4

Your turn

Calculate an estimate for the mean mass:

Mass, x (kg)	Frequency
$0 < x \leq 10$	6
$10 < x \leq 20$	2
$20 < x \leq 40$	0
$40 < x \leq 46$	7
$46 < x \leq 50$	3

28.1 kg (1 dp)

Worked example

Given the mean is 29 kg , find x

Mass, x (kg)	Frequency
$0 < x \leq 10$	5
$10 < x \leq 20$	3
$20 < x \leq 40$	2
$40 < x \leq 46$	x
$46 < x \leq 50$	4

Your turn

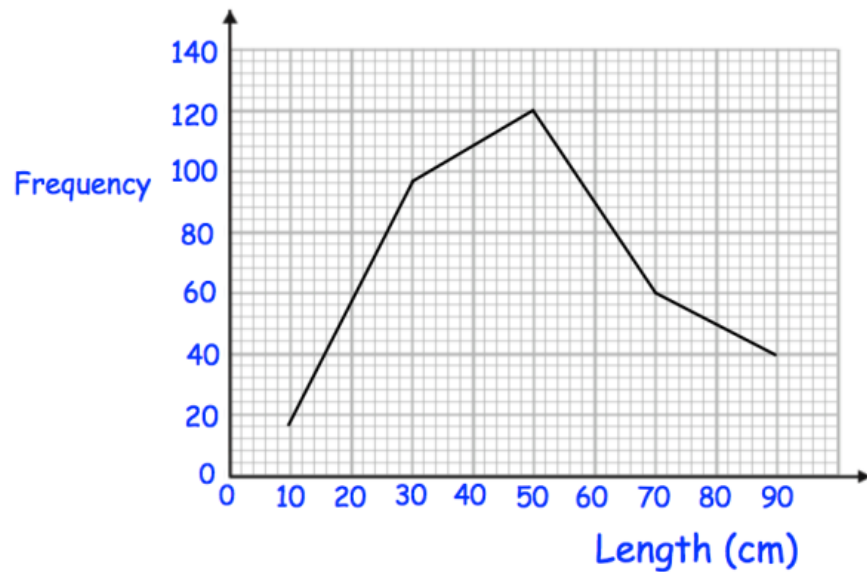
Given the mean is $\frac{449}{15} \text{ kg}$

Mass, x (kg)	Frequency
$0 < x \leq 10$	4
$10 < x \leq 20$	2
$20 < x \leq 40$	x
$40 < x \leq 46$	3
$46 < x \leq 50$	5

$$x = 1$$

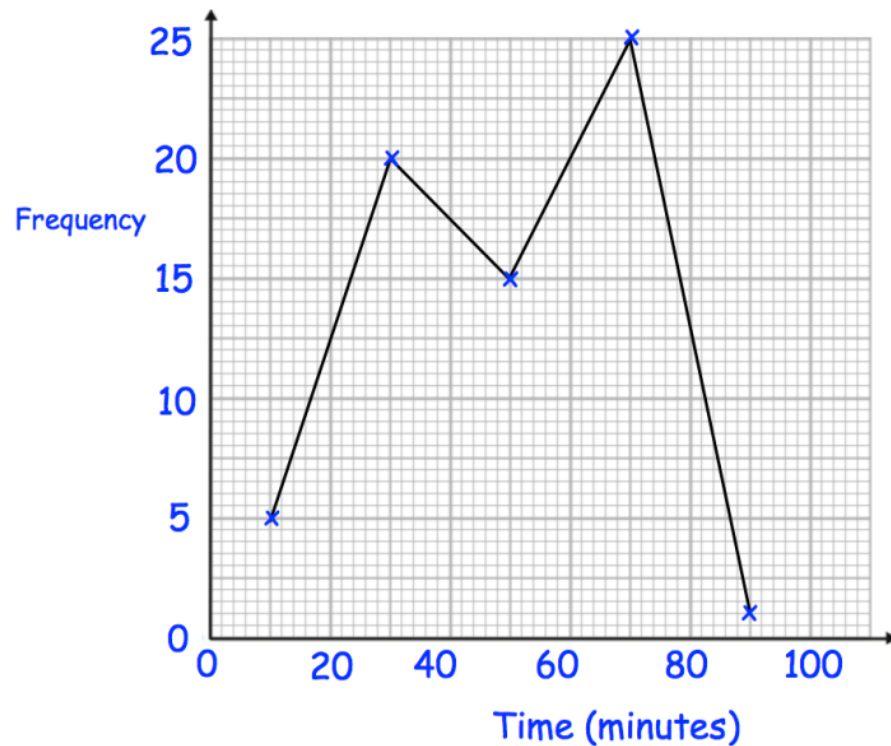
Worked example

Estimate the mean length:



Your turn

Estimate the mean time



49.09 minutes (2 dp)

Worked example

Calculate the median of:

3, 4, 5

3, 4, 5, 6

3, 4, 5, 6, 7

3, 4, 5, 6, 7, 0

Your turn

Calculate the median of:

2, 5, 7, 0, 1

2

Worked example

Calculate the median of:

$2, 9, 3, -1, 5, -4, 8$

$-9, -2, 4, -5, 3, -1, 0, 7$

Your turn

Calculate the median of:

$-11, 1, 13, 0, -5, -2, -9, 6$

-1

Worked example

Calculate the median score

Score	Frequency
0	2
1	3
2	1
3	2
4	2
5	4

Your turn

Calculate the median score

Score	Frequency
0	4
1	6
2	2
3	4
4	4
5	8

3

Worked example

Calculate the median score

Score	Frequency
0	2
1	3
2	1
3	2
4	2
5	7

Your turn

Calculate the median score

Score	Frequency
0	9
1	6
2	2
3	4
4	4
5	8

2

Worked example

Determine the median class interval

Mass, x (kg)	Frequency
$0 < x \leq 10$	5
$10 < x \leq 20$	3
$20 < x \leq 40$	2
$40 < x \leq 46$	6
$46 < x \leq 50$	7

Your turn

Determine the median class interval

Mass, x (kg)	Frequency
$0 < x \leq 10$	15
$10 < x \leq 20$	6
$20 < x \leq 40$	4
$40 < x \leq 46$	12
$46 < x \leq 50$	8

$$20 < x \leq 40$$

Worked example

Estimate the median by linear interpolation

Mass, x (kg)	Frequency
$0 < x \leq 10$	5
$10 < x \leq 20$	3
$20 < x \leq 40$	2
$40 < x \leq 46$	6
$46 < x \leq 50$	7

Your turn

Estimate the median by linear interpolation

Mass, x (kg)	Frequency
$0 < x \leq 10$	15
$10 < x \leq 20$	6
$20 < x \leq 40$	4
$40 < x \leq 46$	12
$46 < x \leq 50$	8

30 kg

Worked example

Estimate the median by linear interpolation

Mass, x (kg)	Frequency
$0 < x \leq 10$	5
$10 < x \leq 20$	3
$20 < x \leq 40$	2
$40 < x \leq 46$	6
$46 < x \leq 50$	11

Your turn

Estimate the median by linear interpolation

Mass, x (kg)	Frequency
$0 < x \leq 10$	15
$10 < x \leq 20$	6
$20 < x \leq 40$	4
$40 < x \leq 46$	18
$46 < x \leq 50$	8

40.17 kg (2 dp)

Worked example

Estimate the interquartile range by linear interpolation

Mass, x (kg)	Frequency
$0 < x \leq 10$	5
$10 < x \leq 20$	3
$20 < x \leq 40$	2
$40 < x \leq 46$	6
$46 < x \leq 50$	11

Your turn

Estimate the median by linear interpolation

Mass, x (kg)	Frequency
$0 < x \leq 10$	15
$10 < x \leq 20$	6
$20 < x \leq 40$	4
$40 < x \leq 46$	18
$46 < x \leq 50$	8

40.17 kg (2 dp)

Worked example

Estimate the interquartile range by linear interpolation

Weight (w kg)	Frequency
$80 < w \leq 90$	3
$90 < w \leq 100$	5
$100 < w \leq 110$	7
$110 < w \leq 120$	4
$120 < w \leq 130$	1

Your turn

Estimate the interquartile range by linear interpolation

Distance travelled (d km)	Frequency
$0 < d \leq 5$	28
$5 < d \leq 10$	32
$10 < d \leq 15$	20
$15 < d \leq 20$	14
$20 < d \leq 25$	6

9.29 km (2 dp)

Worked example

Calculate the mode of:

3, 3, 5

3, 5, 5

3, 3, 5, 5

3, 3, 4, 5, 5

3, 3, 3, 4, 5, 5

Your turn

Calculate the mode of:

2, 5, 3, 2, 5, 1, 2

2

Worked example

Determine the modal class interval

Mass, x (kg)	Frequency
$0 < x \leq 10$	5
$10 < x \leq 20$	3
$20 < x \leq 40$	2
$40 < x \leq 46$	6
$46 < x \leq 50$	7

Your turn

Determine the modal class interval

Mass, x (kg)	Frequency
$0 < x \leq 10$	15
$10 < x \leq 20$	6
$20 < x \leq 40$	4
$40 < x \leq 46$	12
$46 < x \leq 50$	8

$$0 < x \leq 10$$

Worked example

Calculate the range of:

3, 4, 5

3, 4, 7

-3, 4, 7

-3, 2, 4, -7

-3, -4, -7

Your turn

Calculate the range of:

-2, 5, 3, -11, 1

16

Worked example

Calculate the range of:

3, 4, 5

3, 4, 7

-3, 4, 7

-3, 2, 4, -7

-3, -4, -7

Your turn

Calculate the range of:

-2, 5, 3, -11, 1

16

Worked example

Calculate the interquartile range of:

3, 5, 7, 10, 2, 0, -4, 12, -1

2, 8, 1, 6, 4, 0, -5, 3, 15

Your turn

Calculate the interquartile range of:

2, 9, -5, -8, 3, 7, 2, 0, 14, 20, 19

14

Worked example

Calculate the mean, median, mode and range of:

8, 5, 4, 4, 5

Your turn

Calculate the mean, median, mode and range of:

4, 4, 3, 7, 4

All 4

Worked example

Write a list of five numbers with a:

Mean of 4

Median of 4

Mode of 4

Range of 4

Your turn

Write a list of five numbers with a:

Mean of 5

Sum to 25

Median of 5

3rd term is 5

Mode of 5

5 occurs most often

Range of 5

Highest – Lowest is 5

Worked example

Write a list of four numbers with a:

Mean of 4

Median of 4

Mode of 4

Range of 4

Your turn

Write a list of four numbers with a:

Mean of 5 Sum to 20

Median of 5 Mean of 2nd and 3rd term is 5

Mode of 5 5 occurs most often

Range of 5 Highest – Lowest is 5

Worked example

One number is missing.

4, 3, 7, 6, __

What is the last number if the:

Mean is 4

Mode is 4

Median is 4

Range is 4

Your turn

One number is missing.

2, 5, 1, 4, __

What is the last number if the:

Mean is 4

8

Mode is 4

4

Median is 4 Any number greater than 4

Range is 4 Any number between 1 and 5 inclusive