Frequency polygons

Worked solutions

GCSE Maths topic practice

This topic online

1 The table shows the number of minutes, t, that 40 pupils spent on homework one evening.

Time (t minutes)	Frequency
$0 < t \leq 20$	6
$20 < t \leq 40$	15
$40 < t \leq 60$	12
$60 < t \leq 80$	7

Write down the midpoint of each class. (2 marks)

(Lower end + upper end) ÷ 2

(0 + 20) ÷ 2 = 10

(20 + 40) ÷ 2 = 30

(40 + 60) ÷ 2 = 50

(60 + 80) ÷ 2 = 70

10, 30, 50, 70

2 The table shows the lengths, l cm, of 32 runner beans.

Length (l cm)	Frequency
$10 < l \leq 15$	3
$15 < l \leq 20$	9
$20 < l \leq 25$	12
$25 < l \leq 30$	8

Jamal is going to draw a frequency polygon for this information.

Write down the coordinates of the four points he should plot. (2 marks)

Midpoints

(10 + 15) ÷ 2 = 12.5

(15 + 20) ÷ 2 = 17.5

(20 + 25) ÷ 2 = 22.5

(25 + 30) ÷ 2 = 27.5

(midpoint, frequency)

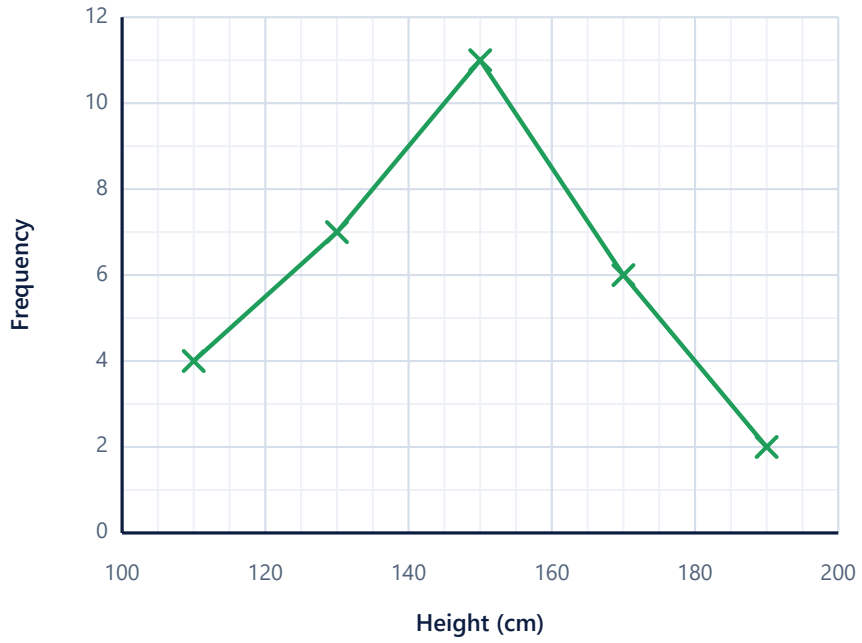
(12.5, 3), (17.5, 9), (22.5, 12), (27.5, 8)

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3 The table shows the heights, h cm, of 30 sunflowers.

Height (h cm)	Frequency
$100 < h \leq 120$	4
$120 < h \leq 140$	7
$140 < h \leq 160$	11
$160 < h \leq 180$	6
$180 < h \leq 200$	2

On the grid, draw a frequency polygon for this information.



(2 marks)

Midpoints

110, 130, 150, 170, 190

Plot (midpoint, frequency)

(110, 4), (130, 7), (150, 11)

(170, 6), (190, 2)

Join in order with straight lines

Polygon drawn through the five points

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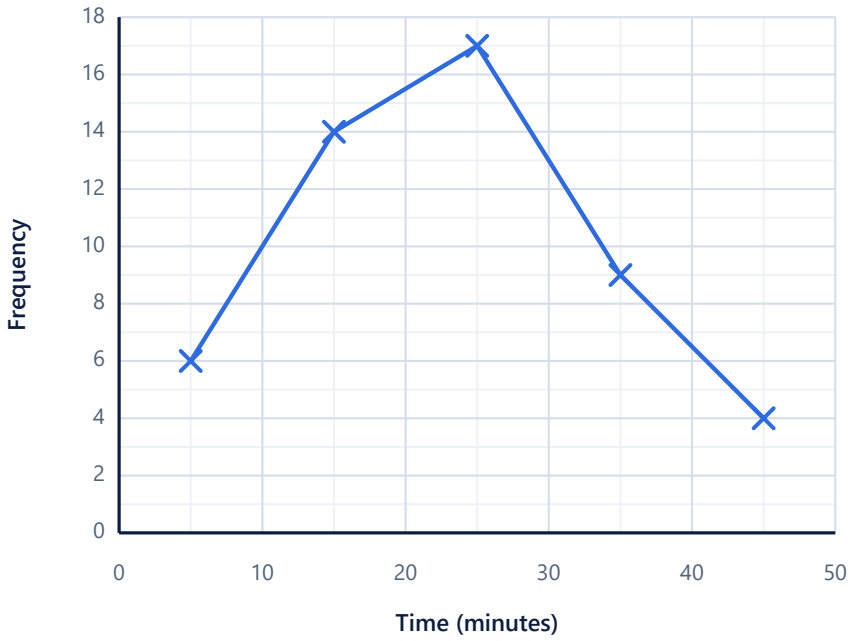
4 The frequency polygon shows information about the times, t minutes, that some customers spent in a café.

The classes are $0 < t \leq 10$, $10 < t \leq 20$, $20 < t \leq 30$, $30 < t \leq 40$ and $40 < t \leq 50$.

a. How many customers spent between 20 and 30 minutes in the café?

b. How many customers are shown altogether?

c. Write down the modal class.



(3 marks)

a) Point above midpoint 25

17

b) Read every point

$6 + 14 + 17 + 9 + 4 = 50$

50

c) Highest point is at 25

$20 < t \leq 30$

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5 The table shows the test marks, m, of 28 pupils.

Mark (m)	Frequency
$0 < m \leq 10$	3
$10 < m \leq 20$	8
$20 < m \leq 30$	12
$30 < m \leq 40$	5

Kai draws a frequency polygon. He plots the points (10, 3), (20, 8), (30, 12) and (40, 5). He joins them with straight lines, then joins (40, 5) back to (10, 3).

Write down two mistakes Kai has made.

(2 marks)

Midpoints should be

5, 15, 25, 35

Kai used the ends of the classes

A frequency polygon is not closed

Not at midpoints, and last point joined back to the first

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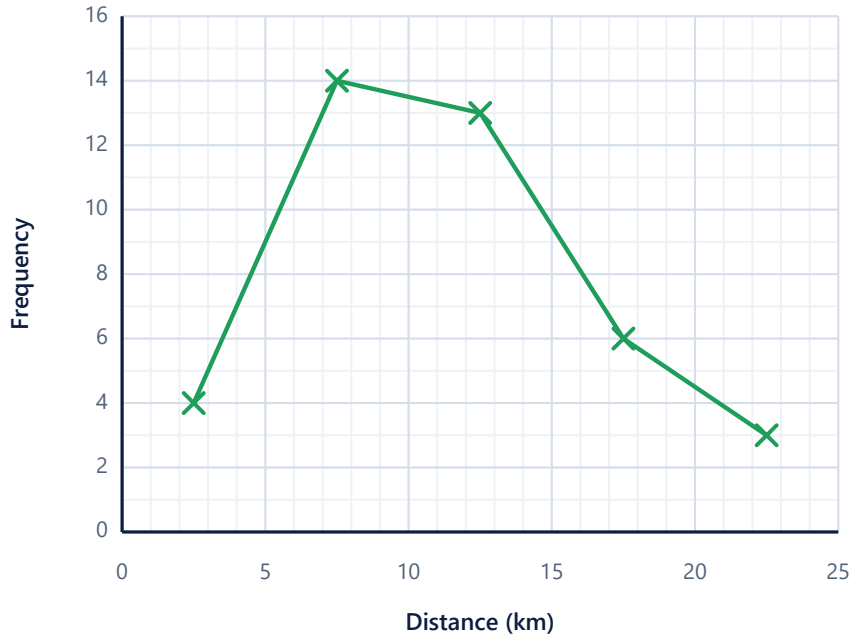
6 The table shows the distances, d km, that 40 people travel to work.

Distance (d km)	Frequency
$0 < d \leq 5$	4
$5 < d \leq 10$	14
$10 < d \leq 15$	13
$15 < d \leq 20$	6
$20 < d \leq 25$	3

a. On the grid, draw a frequency polygon for this information.

b. Write down the modal class.

c. Write down the class that contains the median.



(4 marks)

a) Midpoints

2.5, 7.5, 12.5, 17.5, 22.5

(2.5, 4), (7.5, 14), (12.5, 13), (17.5, 6), (22.5, 3)

Points joined with straight lines

b) Highest frequency is 14

$5 < d \leq 10$

c) Median is between the 20th and 21st

4 + 14 = 18

18 + 13 = 31

20th and 21st are in the third class

$10 < d \leq 15$

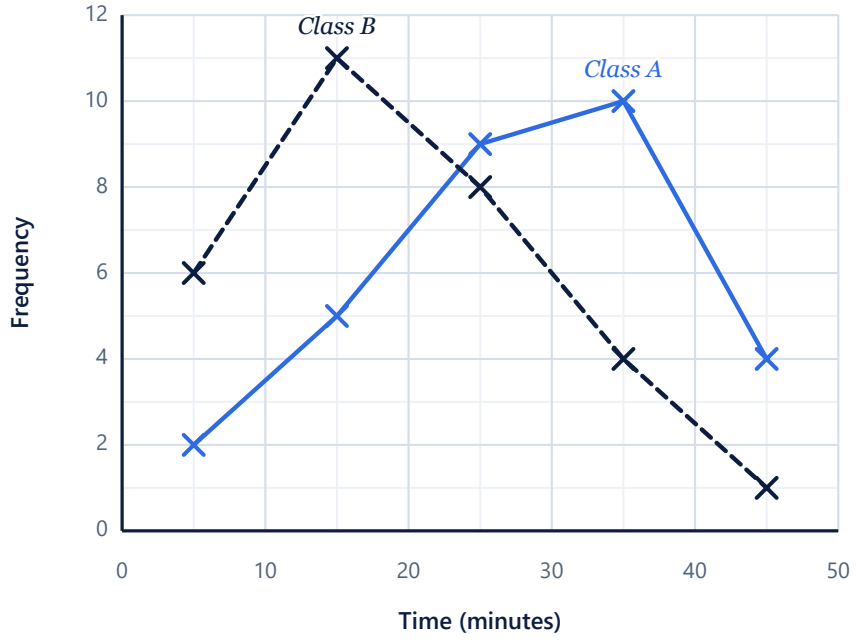
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7 The frequency polygons show the times, t minutes, that 30 pupils in Class A and 30 pupils in Class B spent on homework one night.

The classes are $0 < t \leq 10$, $10 < t \leq 20$, $20 < t \leq 30$, $30 < t \leq 40$ and $40 < t \leq 50$.

a. How many pupils in Class B spent more than 30 minutes on homework?

b. Which class generally spent longer on homework? Give a reason for your answer.



(3 marks)

a) Class B is the dashed line

4 + 1 = 5

5

b) Compare where the peaks are

Class A modal class: $30 < t \leq 40$

Class B modal class: $10 < t \leq 20$

Class A: its polygon is further to the right

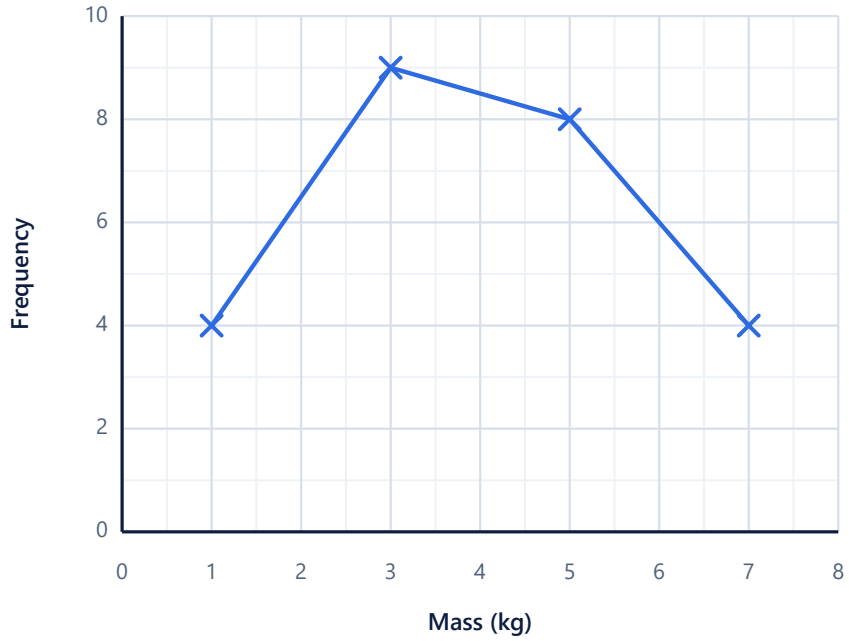
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8 The frequency polygon shows information about the masses, m kg, of some parcels.

The classes are $0 < m \leq 2$, $2 < m \leq 4$, $4 < m \leq 6$ and $6 < m \leq 8$.

a. How many parcels are there?

b. Work out an estimate for the mean mass of a parcel.



(4 marks)

a)

4 + 9 + 8 + 4 = 25

25

b) midpoint x frequency

1 x 4 = 4

3 x 9 = 27

5 x 8 = 40

7 x 4 = 28

total = 99

mean = 99 ÷ 25

mean = 3.96

3.96 kg

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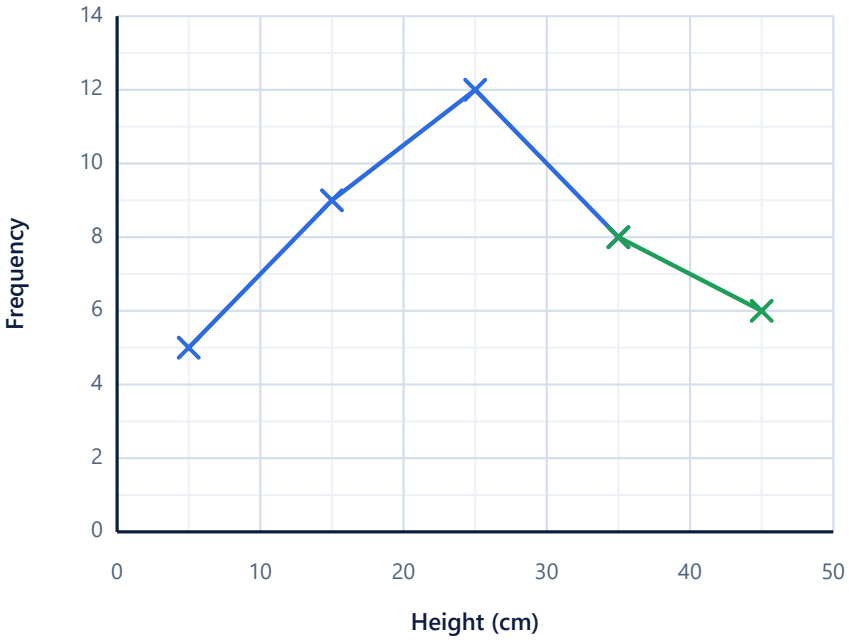
9 Some students measured the heights, h cm, of 40 plants.

The classes are $0 < h \leq 10$, $10 < h \leq 20$, $20 < h \leq 30$, $30 < h \leq 40$ and $40 < h \leq 50$.

The frequency polygon on the grid is not finished: the point for the class $40 < h \leq 50$ is missing.

a. Work out the frequency of the class $40 < h \leq 50$

b. Complete the frequency polygon.



(3 marks)

a) Add the frequencies shown

$5 + 9 + 12 + 8 = 34$

$40 - 34 = 6$

6

b) Midpoint of $40 < h \leq 50$ is 45

Plot (45, 6)

Join (35, 8) to (45, 6)

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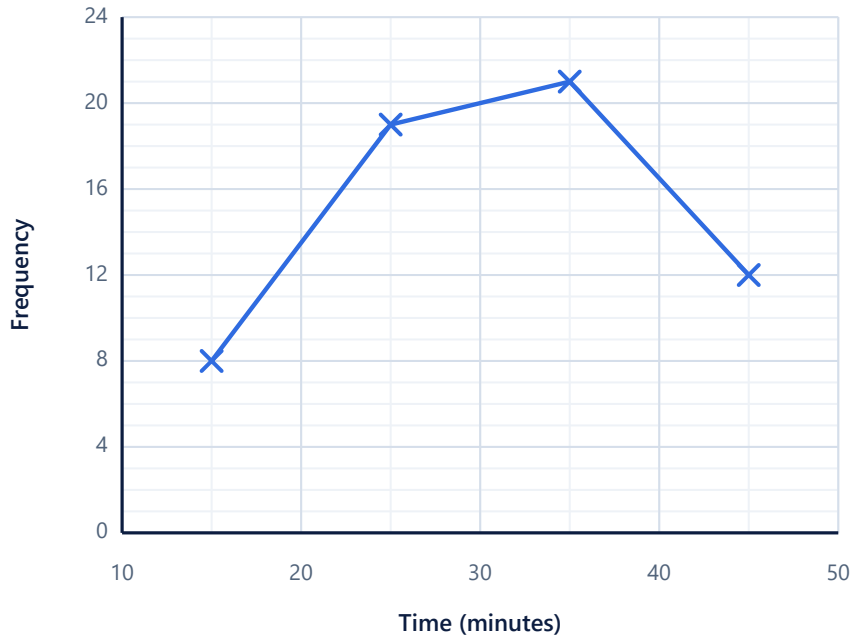
10 The frequency polygon shows the times, t minutes, that 60 runners took to finish a fun run.

The classes are $10 < t \leq 20$, $20 < t \leq 30$, $30 < t \leq 40$ and $40 < t \leq 50$.

Lena says, "More than half of the runners took longer than 30 minutes."

a. How many runners took longer than 30 minutes?

b. Is Lena correct? Give a reason for your answer.



(3 marks)

a) Classes above 30 minutes

21 + 12 = 33

33

b)

half of 60 = 30

33 > 30

Yes, Lena is correct

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