



Frequency polygons

About 50 minutes Calculator allowed 35 marks

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

- A1** Needed today [2 marks] Times, t minutes: $40 < t \leq 60$ (frequency 11), $60 < t \leq 80$ (frequency 12), $80 < t \leq 100$ (frequency 2). Work out an estimate of the mean time.
- A2** From chapter 16 [2 marks] Numbers with 2 digits are made from the digits 2, 5, 6, 7, 8 and 9, using each digit at most once. How many of these numbers are even?

Answer

Answer

- A3** Last lesson [2 marks] A school has 340 Year 9 students, 70 Year 10 students and 60 Year 11 students. A stratified sample of 47 is taken. How many Year 9 students should be in the sample?
- A4** From chapter 10 [2 marks] Are the lines $2y = 2x + 9$ and $x + y = -6$ parallel, perpendicular or neither?

Answer

Answer

B Example, then your turn

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

The heights of 30 plants are in classes $0 < h \leq 6$, $6 < h \leq 12$, $12 < h \leq 18$, $18 < h \leq 24$, with frequencies 2, 8, 13, 7. Write down the points to plot.

Hint Plot each frequency above the middle of its class.

- B1** The masses of 40 parcels are [2 marks] in classes $10 < m \leq 15$, $15 < m \leq 20$, $20 < m \leq 25$, $25 < m \leq 30$, with frequencies 6, 15, 13, 6. Write down the points to plot.

Answer

EXAMPLE 2

Work out an estimate of the mean height of the plants in Example 1.

Hint Find Σfx with the mid-class values, then divide by Σf .

- B2** Work out an estimate of the mean mass of the parcels in B1. Give your answer to 1 decimal place. [3 marks]

Answer

c Practice

- C1** Write down the mid-class value of the class $45 < d \leq 60$. [1 mark]

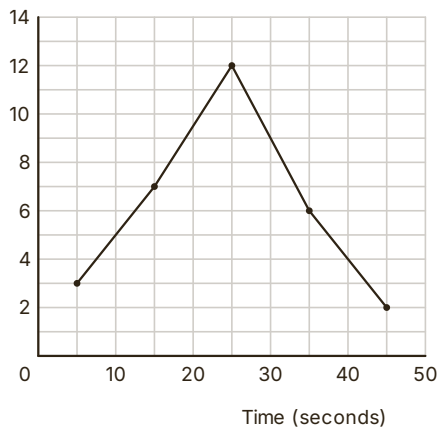
Answer

- C2** A frequency polygon has a point at $(35, 12)$ and classes 10 seconds wide. Write down the class and its frequency. [2 marks]

Answer

- C3** The frequency polygon shows the times taken by some people to solve a puzzle. How many people were timed, and how many took more than 30 seconds? [2 marks]

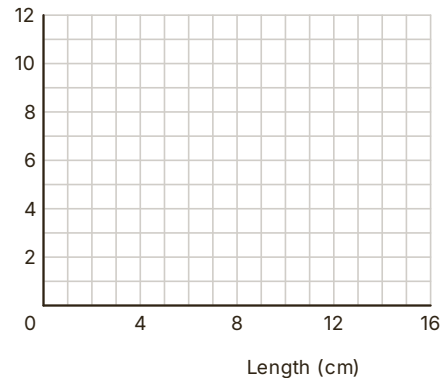
Frequency



Answer people over 30 s

- C4** The lengths, l cm, of 28 leaves are grouped as $0 < l \leq 4$: 3, $4 < l \leq 8$: 9, $8 < l \leq 12$: 11, $12 < l \leq 16$: 5. Draw a frequency polygon for the data on the grid. [2 marks]

Frequency



- C5** Explain why a mean worked out from a grouped table is only an estimate. [1 mark]

D Exam-style questions

D1

Waiting times of 40 people: $0 < t \leq 20$, $20 < t \leq 40$, $40 < t \leq 60$, $60 < t \leq 80$, with frequencies 14, 18, 6, 2. Mo says, "The estimate of the mean is 40 minutes, because the mean of 10, 30, 50 and 70 is 40."

[3 marks]

Explain why Mo is wrong, and work out the correct estimate of the mean.

D2 A café records how long 40 customers wait for a drink on a Monday and on a Saturday.

Time, t (minutes)	Monday	Saturday
$0 < t \leq 10$	4	2
$10 < t \leq 20$	9	6
$20 < t \leq 30$	15	12
$30 < t \leq 40$	7	14
$40 < t \leq 50$	5	6

(a) Write down the modal class for Saturday.

[1 mark]

Answer

(b) Work out an estimate of the mean waiting time on each day.

[4 marks]

Answer Monday Saturday

(c) Compare the waiting times on the two days.

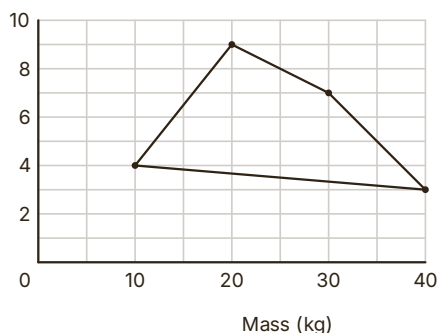
[1 mark]

Total for D2: 6 marks

D3 The masses of 23 suitcases are grouped as $0 < m \leq 10$: 4, $10 < m \leq 20$: 9, $20 < m \leq 30$: 7, $30 < m \leq 40$: 3. Kai draws this frequency polygon for the data. Write down two mistakes he has made.

[2 marks]

Frequency



E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** A frequency polygon is drawn from classes of different widths that follow on from each other, the first starting at 0. Its points are (2.5, 12), (10, 18), (25, 20) and (50, 10). Work out the upper end of the last class. [3 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Each x -value is the middle of its class, so the class goes as far above it as below it.
- Hint 2** The first class is 0 to 5; the second starts at 5 with its middle at 10.
- Hint 3** The classes are 0–5, 5–15, 15–35 and 35–65, so the answer is 65.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

- I can draw and read a frequency polygon, and spot mistakes in one. ☐ ☐ ☐
- I can work out an estimate of the mean from a grouped table. ☐ ☐ ☐
- I can compare two distributions using their averages. ☐ ☐ ☐