

Drawing frequency diagrams

Year 7 About 70 minutes No calculator 45 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/ks3-year-7-drawing-frequency-diagrams/

Date _____

A Do Now

Quick questions to start.

- A1

Needed today

[1 mark]

What number is exactly halfway between 10 and 20?

Answer
- A2

Needed today

[1 mark]

On an axis, 0 and 10 are 5 squares apart. What does one square stand for?

Answer

- A3

Last lesson

[1 mark]

How many of these times are in the class $10 < t \leq 20$? 12, 18, 9, 20, 25

Answer
- A4

From chapter 15

[1 mark]

Solve $4(x - 3) = 20$.

Answer

B Example, then your turn

Year 7

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

EXAMPLE 1

The table shows the times 20 runners took in a race. Draw a frequency diagram for the data.

Time, t (min)	Frequency
$20 < t \leq 30$	3
$30 < t \leq 40$	7
$40 < t \leq 50$	6
$50 < t \leq 60$	4

Hint Time is continuous, so the bars touch. The biggest frequency is 7, so the frequency axis must reach at least 7.

- B1

[3 marks]

The table shows the heights of 30 sunflowers. Draw a frequency diagram for the data.

Height, h (cm)	Frequency
$100 < h \leq 120$	5
$120 < h \leq 140$	9
$140 < h \leq 160$	11
$160 < h \leq 180$	5

EXAMPLE 2

The table shows how long 24 pupils spent on homework. Draw a line graph for the data.

Time, t (min)	Frequency
$0 < t \leq 20$	4
$20 < t \leq 40$	10
$40 < t \leq 60$	7
$60 < t \leq 80$	3

Hint Plot each frequency above the middle of its class. The middle of $0 < t \leq 20$ is 10.

EXAMPLE 3

Should the bars touch? Give a reason each time. (a) The shoe sizes of 30 pupils. (b) The times 30 pupils take to run 100 m.

Hint Can the data take any value between two of its numbers, or only certain values?

B2 The table shows the masses of 27 parcels. Draw a line graph for the data. Write down the points you plot. [3 marks]

Mass, m (kg)	Frequency
$0 < m \leq 4$	6
$4 < m \leq 8$	11
$8 < m \leq 12$	8
$12 < m \leq 16$	2

B3 Should the bars touch? Give a reason each time. (a) The numbers of goals scored in 20 matches. (b) The masses of 40 apples. (c) The lengths of 25 worms. [3 marks]

- C1** A line graph is drawn for the table. Write down the four points that are plotted. [2 marks]

Distance, d (km)	Frequency
$0 < d \leq 2$	7
$2 < d \leq 4$	12
$4 < d \leq 6$	9
$6 < d \leq 8$	4

- C2** A frequency diagram shows the ages of 40 people. The table gives the heights of its bars. How tall is the missing bar? [2 marks]

Age, a (years)	Bar height
$0 < a \leq 20$	8
$20 < a \leq 40$	15
$40 < a \leq 60$	?
$60 < a \leq 80$	5

Answer

Answer

- C3** Jo draws a frequency diagram of the masses of 25 cats. She leaves gaps between the bars. Explain why this is wrong. [2 marks]

- C4** On a line graph, Leo plots the point for the class $15 < t \leq 25$ above $t = 25$. Explain his mistake and give the right value of t . [2 marks]

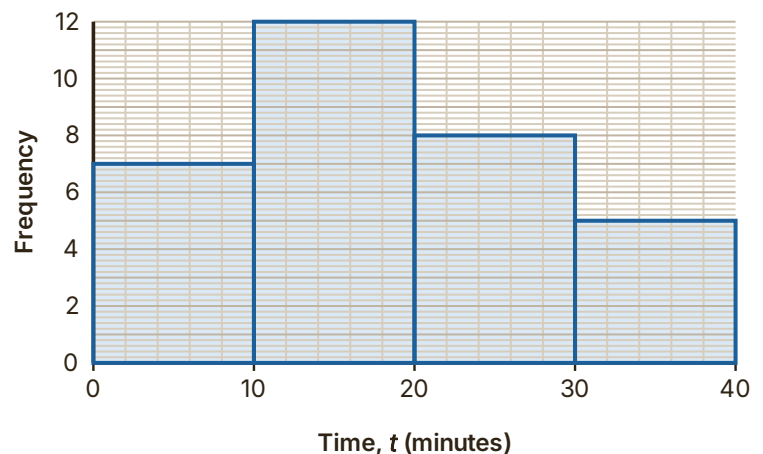
D Exam-style questions

GCSE Foundation

- D1** The frequency diagram shows how long some people queued at a post office. Raj says, "More than half of the people queued for longer than 20 minutes." [3 marks]

Is Raj right? You must show your working.

Answer



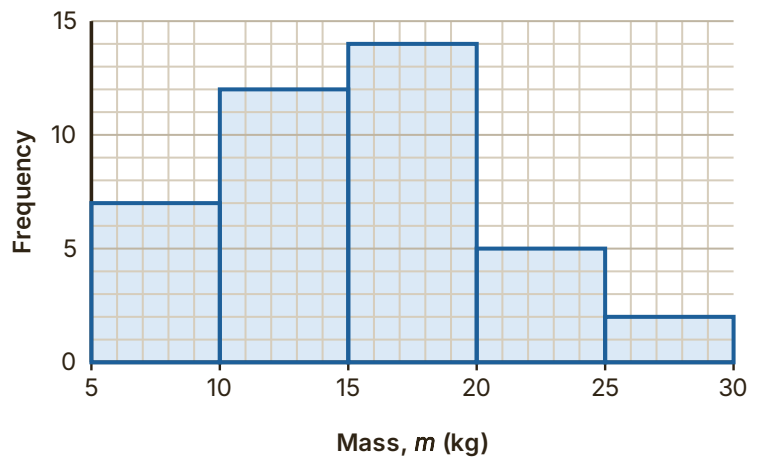
D2 The frequency diagram shows the masses of some suitcases at an airport.

- (a) Write down the modal class. [1 mark]

Answer

- (b) How many suitcases are there altogether? [1 mark]

Answer



- (c) A suitcase over 20 kg pays a fee. What fraction of the suitcases pay the fee? [2 marks]
Give your answer in its simplest form.

Answer

- (d) A line graph is drawn from the same data. Write down the point plotted for the class $15 < m \leq 20$. [2 marks]

Answer

Total for D2: 6 marks

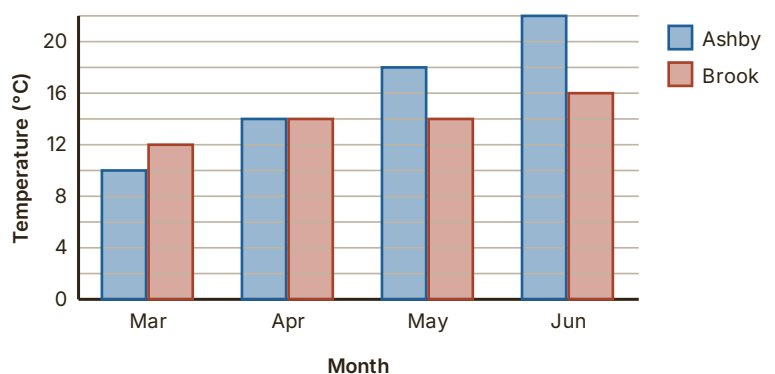
D3 The bar chart shows the mean temperature in two towns, Ashby and Brook, for four months.

- (a) In which month is the difference between the two towns largest? [1 mark]

Answer

- (b) Work out that difference. [1 mark]

Answer



- (c) In how many of the months is Ashby warmer than Brook? [1 mark]

Answer

(d) Work out the range of the temperatures in Ashby.

[2 marks]

Answer

Total for D3: 5 marks

D4 The table shows the travel times of 50 pupils.

(a) Work out the missing frequency. [2 marks]

Answer

(b) Draw a frequency diagram for the data. [3 marks]

Time, t (min)	Frequency
$0 < t \leq 10$	9
$10 < t \leq 20$	?
$20 < t \leq 30$	14
$30 < t \leq 40$	8

Total for D4: 5 marks

E Extension

Stretch

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

E1 A frequency diagram shows the times 38 pupils took to finish a puzzle. It has four bars. The second bar is twice as tall as the first. The third bar is 3 shorter than the second. The fourth bar has height 6. Work out the height of each bar. [5 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Call the height of the first bar x .
Hint 2 $x + 2x + (2x - 3) + 6 = 38$
Hint 3 $5x + 3 = 38$, so $x = 7$. Then the bars are 7, 14, 11 and 6.

How did it go?

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

- I can draw a frequency diagram from a table. ☐ ☐ ☐
- I can draw a line graph from a table. ☐ ☐ ☐
- I can say when the bars should touch. ☐ ☐ ☐
- I can read values off frequency diagrams. ☐ ☐ ☐