Chain base index numbers

Grade 6 | Worked solutions

GCSE Statistics topic practice

1 The table shows the price of an adult ticket at a cinema in three years.

Year	2023	2024	2025
Ticket price	£8.00	£8.80	£9.24

a. Work out the chain base index numbers for the ticket price in 2024 and in 2025. (2)

b. In which year, 2024 or 2025, did the price rise by the greater percentage? Give a reason for your answer. (1)

(3 marks)

a)

Chain base index = price ÷ price the year before × 100

$$2024 \text{ index} = \frac{8.80}{8.00} \times 100$$

$$= 110$$

$$2025 \text{ index} = \frac{9.24}{8.80} \times 100$$

$$= 105$$

b)

2024, because 110 > 105

The price rose 10% in 2024 but only 5% in 2025.

a) 110 and 105 b) 2024, a 10% rise

2 The table shows the annual rent for a flat in three years.

Year	2023	2024	2025
Annual rent	£8000	£8400	£9240

a. Work out the chain base index numbers for the rent in 2024 and in 2025. (2)

b. Interpret your chain base index number for 2025. (1)

c. The chain base index number for the rent in 2026 is 95. Work out the annual rent in 2026. (1)

(4 marks)

a)

Chain base index = value ÷ value the year before × 100

$$2024 \text{ index} = \frac{8400}{8000} \times 100$$

$$= 105$$

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$$2025 \text{ index} = \frac{9240}{8400} \times 100$$

$$= 110$$

b)

The rent went up by 10% from 2024 to 2025.

c)

$$\frac{95}{100} \times 9240 = 8778$$

a) 105 and 110 b) up 10% on the year before c) £8778

3 In 2022 a year of membership at a gym cost £200. The table shows the chain base index numbers for the cost of membership in the next three years.

Year	2023	2024	2025
Chain base index number	110	105	100

a. Work out the cost of membership in 2024. (2)

b. Describe what happened to the cost of membership in 2025. (1)

c. Jo says, "The index number for 2024 is lower than the index number for 2023, so the cost went down in 2024." Explain why Jo is wrong. (1)

(4 marks)

a)

$$2023 \text{ cost} = \frac{110}{100} \times 200$$

$$= 220$$

$$2024 \text{ cost} = \frac{105}{100} \times 220$$

$$= 231$$

b)

An index number of 100 means no change.

The cost stayed the same, at £231.

c)

105 is more than 100, so the cost still went up in 2024, by 5%.

It only goes down if the index is below 100.

a) £231 b) no change c) 105 > 100 so it rose

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4 The table shows the chain base index numbers for the average price of a second-hand car at a garage.

Year	2024	2025
Chain base index number	120	125

a. Sam says, "20% and then 25% makes 45%, so the average price rose by 45% from 2023 to 2025." Show that Sam is wrong. (3)

b. Write down what a chain base index number tells you that an index number with 2023 as its base year does not. (1)

(4 marks)

a)

120 ÷ 100 = 1.2

125 ÷ 100 = 1.25

Multiply to go from 2023 to 2025

1.2 × 1.25 = 1.5

1.5 × 100 = 150

The price rose by 50%, not 45%.

The 25% rise is 25% of the 2024 price,

which is already higher than the 2023 price.

b)

It shows the percentage change

from one year to the next.

a) 1.2 × 1.25 = 1.5, a 50% rise b) the change each year

5 The table shows some information about the hourly rate of pay for a job in a warehouse.

Year	2022	2023	2024	2025
Hourly rate of pay	£10.00	£10.50		£13.86
Chain base index number			120	

a. Work out the hourly rate of pay in 2024 and the chain base index numbers for 2023 and 2025. (3)

b. In 2026 the hourly rate of pay is 5% lower than in 2025. Write down the chain base index number for 2026. (1)

c. Explain why the chain base index number for 2022 cannot be worked out from the table. (1)

(5 marks)

a)

$$2023 \text{ index} = \frac{10.50}{10.00} \times 100$$

$$= 105$$

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$$2024 \text{ rate} = \frac{120}{100} \times 10.50$$

$$= 12.60$$

$$2025 \text{ index} = \frac{13.86}{12.60} \times 100$$

$$= 110$$

b)

$100 - 5 = 95$

c)

A chain base index number compares a year with the year before.

The rate of pay in 2021 is not given.

a) £12.60, 105 and 110 b) 95 c) no 2021 value

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