



H24-test Weighted and Chain Base Index Numbers: Test Pack

EDEXCEL 1ST0 · Calculator allowed · about 25 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** A campsite tracks the price of a standard pitch fee each year, using 2020 as the base year. The index number for the pitch fee in a given year is defined as:

index number = (price in that year / price in the base year) $\times$ 100

Year	Price of pitch fee (£)
2020 (base year)	25.00
2021	27.50
2022	30.00

- (a) Show that the index number for the pitch fee in 2021 is 110. (2)

- (b) Work out the index number for the pitch fee in 2022. (2)

- (c) Write down what the index number of 120 tells you about the price of the pitch fee in 2022, compared with the base year. (1)

(Total for Question 1 is 5 marks)

2 Two students are working with index numbers.

Student A is finding a chain-base index number for a shop's sales, using Year 3 sales of £84,000 and Year 2 sales of £80,000:

Step 1: $84,000 / 80,000 = 1.05$

Step 2: chain-base index number = 1.05

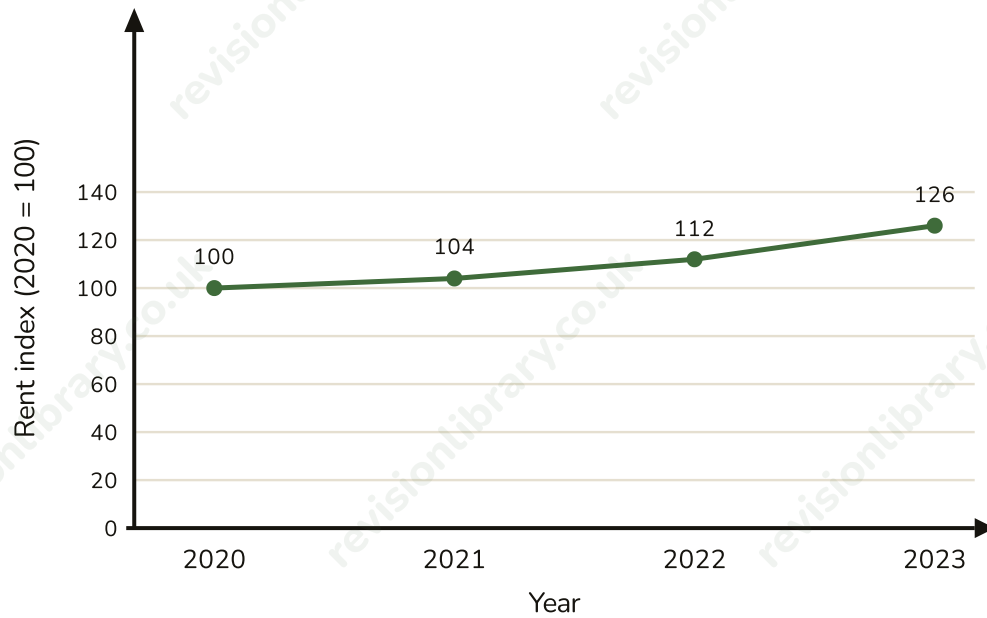
Student B is given a fixed-base index number (Year 1 = 100) for the same shop's sales. The fixed-base index number for Year 4 is 118. Student B says: 'Since the index is 118, sales have increased by 118% since Year 1.'

(a) Identify Student A's error, and give the correct chain-base index number. (2)

(b) Identify Student B's error, and state the correct percentage increase in sales from Year 1 to Year 4. (2)

(Total for Question 2 is 4 marks)

- 3** The line graph shows the fixed-base index number (2020 = 100) for the average monthly rent of a one-bedroom flat in a town, for the years 2020 to 2023.



- (a) Use the graph to write down the fixed-base index number for 2022. (1)
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- (b) Use the graph to work out the percentage increase in rent from 2020 to 2023. (2)
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- (c) Use the graph to work out the chain-base index number for 2023, compared with 2022. (2)
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- (d) A tenant notices that the index rose by 4 points from 2020 to 2021 (100 to 104), but by 14 points from 2022 to 2023 (112 to 126). The tenant claims: 'Rent rose about three and a half times as fast between 2022 and 2023 as it did between 2020 and 2021, since 14 is three and a half times 4.' Use your chain-base result from part (c), together with the percentage increase from 2020 to 2021, to comment on whether comparing raw index-point rises like this gives an accurate measure of how much faster rent was rising. (3)

(Total for Question 3 is 8 marks)

- 4 A weighted price index has four categories:

Category	Weight	Sub-index
A	2	105
B	3	118
C	4	w
D	1	130

The overall weighted index for all four categories is 117.

- (a) Show that the combined weighted contribution of categories A, B and D is 694. (2)
- (b) Given that the overall weighted index for all four categories is 117, find the value of w, the missing sub-index for category C. (3)
- (c) Explain why knowing that category C's sub-index is 119 does not, by itself, tell you the actual price of category C's goods this year. (1)

(Total for Question 4 is 6 marks)

Mark scheme · H24-test Weighted and Chain Base Index Numbers: Test Pack

Question 1

- (a) **M1** $27.50 / 25.00$, oe (correct ratio)
- (a) **A1** 110 cso
- (a) **Answer: 110**
- (b) **M1** $30.00 / 25.00$, oe
- (b) **A1** 120 cao
- (b) **Answer: 120**
- (c) **B1** the price in 2022 is 20% higher than the price in the base year (2020), oe; accept 'the price has increased by 20% since 2020'
- (c) **Answer: The pitch fee in 2022 was 20% higher than in 2020 (the base year).**

Question 2

- (a) **B1** Student A has not multiplied the ratio by 100 (an index number is expressed as a value around 100, not as a decimal ratio), oe
- (a) **B1** 105 cao
- (a) **Answer: Student A forgot to multiply by 100; the correct chain-base index number is 105.**
- (b) **B1** an index of 118 means sales are 118% of the Year 1 value (a growth multiplier of 1.18), so the increase is $118 - 100 = 18\%$, not 118%, oe
- (b) **B1** 18 (%) cao
- (b) **Answer: Student B should have subtracted 100 from the index; the correct percentage increase is 18%.**

Question 3

- (a) **B1** 112 cao
- (a) **Answer: 112**
- (b) **M1** $(126 - 100) / 100$, oe
- (b) **A1** 26 (%) cao
- (b) **Answer: 26%**
- (c) **M1** $126 / 112$, oe
- (c) **A1** 112.5 cao
- (c) **Answer: 112.5**
- (d) **M1** $(104 - 100) / 100$, oe, to find the 2020-2021 percentage increase (=4%)
- (d) **B1** 12.5 (%), ft from (c) (percentage increase 2022 to 2023)
- (d) **B1** comparing the percentage increases ($12.5\% / 4\% = 3.125$) instead of the raw point rises ($14 / 4 = 3.5$) gives a different, more accurate ratio, because the same number of index points represents a smaller percentage change when the index level itself is already higher, so raw point differences should not be used to compare speeds of change; percentage/chain-base changes should be used instead, oe
- (d) **Answer: 2020 to 2021: 4% increase. 2022 to 2023: 12.5% increase (from part c). The true ratio is $12.5 / 4 = 3.125$, not 3.5, so comparing raw index-point rises overstates the comparison; percentage (chain-base) changes give the accurate measure, since the same point-rise represents a smaller percentage change when it is measured from a higher index level.**

Question 4

- (a) **M1** $2 \times 105, 3 \times 118, 1 \times 130$ ($=210, 354, 130$), oe
- (a) **A1** 694 cso
- (a) **Answer: 694**
- (b) **M1** $117 \times (2+3+4+1)$ ($=1170$), ft from (a)
- (b) **M1** $1170 - 694$ ($=476$), dep
- (b) **A1** $w=119$ cao
- (b) **Answer: $w = 119$**
- (c) **B1** a sub-index only shows the price relative to the base year ($=100$); you would also need to know the actual base-year price of category C to work out the actual current price, oe
- (c) **Answer: A sub-index of 119 only tells you the price is 19% higher than in the base year; without knowing the actual base-year price, you cannot work out the actual current price.**