Compound Interest Growth Decay

GCSE Maths · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

£800 is invested at 4% compound interest per year. Find its value after 3 years.

Step 1 · Multiplier

1.04

Step 2 · Three years

$800 \times 1.04^3 = 800 \times 1.124864$

Step 3 · Evaluate and round to the nearest penny

£899.89

Answer: £899.89

Check: Simple interest would give 800 + 3 × 32 = £896, a little less ✓

2. Now try one with the steps

A £15 000 car loses 20% of its value each year. After how many whole years is it first worth less than £7000?

Step 1 · Multiplier 0.8; try years

Step 2 · Next year

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. £500 is invested at 3% simple interest per year. How much interest is earned in 4 years? [2]

2. Write down the multiplier for a 7% increase. [1]

3. Write down the multiplier for a 15% decrease. [1]

4. £500 is invested at 3% compound interest per year. Find the value after 2 years. [2]

5. A car worth £12 000 depreciates by 15% each year. Find its value after 3 years. [2]

6. £2500 is invested at 2.5% compound interest per year. Find its value after 4 years, to the nearest penny. [2]

7. A town of 8000 people grows by 2.5% per year. After how many whole years does it first exceed 9000? [3]

8. A price rises by 12% and then falls by 12%. What is the overall percentage change? [2]

9. A colony of 50 bacteria doubles every hour. How many are there after 6 hours? [2]

10. A medicine leaves the body at 30% per hour. A patient takes 200 mg. How much remains after 3 hours, in mg? [2]

11. £1000 is invested for 3 years at 5%. How much more interest does compound interest earn than simple interest, to the nearest penny? [3]

12. A boat is worth $V = 20\,000 \times 0.9^n$ pounds after n years. Find its value after 5 years, to the nearest penny. [2]

13. £2000 grows to £2315.25 after 3 years of compound interest. Find the annual interest rate, in %. [3]

14. An investment grows at 4% per year compound interest and is worth £1081.60 after 2 years. How much was invested? [3]

15. A house rises in value by 3%, then by 3% again, then falls by 5%. Find the single multiplier for the overall change, to 4 decimal places. [3]

4. Before you hand it in

£500 at 3% compound for 2 years = 500 + 2 × 15 = £530
Compound interest is earned on the interest too: $500 \times 1.03^2 = £530.45$.

+20% then –20% returns to the start
The fall is 20% of a bigger amount: $1.2 \times 0.8 = 0.96$, a 4% loss overall.

A 15% decrease uses × 1.15 or × 0.15
After a 15% decrease, 85% is left: × 0.85.

4% a year for 3 years = 12% increase
Multipliers multiply: $1.04^3 = 1.124864$, a 12.49% increase.