

GCSE Predicted Topic Questions

Compound Interest & Depreciation

Compound interest is interest calculated on the initial principal, which also includes all of the accumulated interest from previous periods.

For compound interest, we use the formula

$$\text{Compound interest} = A - P$$

$$C.I = P(1+R/100)^n - P$$

Where:

A represents the final amount

P represents the principal original amount

R is the interest over a given period of time

n is the no:of years the interest rate applied

Example 1

Fearne invests £26000 for 3 years in a savings account. She gets 2.5% per annum compound interest.

Calculate **the total amount of interest** Fearne will get after 3 years.

$$\text{Compound interest} = A - P$$

$$C.I = P(1+R/100)^n - P$$

First we will find A,

$$A = 26000(1 + 2.5/100)^3$$

$$A = 26000 \times (1.025) \times (1.025) \times (1.025)$$

$$A = 27999.15$$

Then,

$$\begin{aligned} \text{Total amount of interest} &= 27999.15 - 26000 \\ &= 1999.15 \end{aligned}$$

So the total amount of interest she will get is **£1999.15**

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Example 2

Marleen bought a car for £230 000.

In the first year the car price increased by 3%

In the second year the car price increased by 2%

In the third year the car price depreciated by 5%

Work out the value of the car at the end of 3 years.

First year: $(1+3/100) = 1.03$ (car price increased)

Second year: $(1+2/100) = 1.02$ (car price increased)

Third year: $(1-5/100) = 0.95$ (car price depreciated)

Now apply the formula,

value of the car = $230\,000 \times 1.03 \times 1.02 \times 0.95 = \text{£ } 229,556.1$

Example 3

Daisy bought a new car.

Each year the car depreciates in value by 12%.

Work out the number of years it takes for the car to half in value.

$$\begin{aligned}\text{car value} &= (1-12/100)^n = (0.88)^2 = 0.7744 \\ &= (0.88)^3 = 0.681472 \\ &= (0.88)^4 = 0.59969536 \\ &= (0.88)^5 = 0.5277319168 \\ &= (0.88)^6 = 0.464404868 \\ &\quad \text{(less than 0.5)}\end{aligned}$$

The car takes 6 years to half in value

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Compound Interest & Depreciation

- 1 Annie invests £ 6000 for n years in a savings account.

To find the value, V , of her investment after n years she uses the formula;

$$V = 6000 \times (1.025)^n$$

- a) Write down the annual rate of interest Annie earns.

- b) Find the **total amount of interest** Annie earns in three years.

(Total for question 1 is 3 marks)

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- 2 Fearne invests £18000 for 3 years in a savings account.

She gets 2.6% per annum compound interest.

Calculate **the total amount of interest** Fearne will get after 3 years.

(Total for question 2 is 3 marks)

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3 John bought a house for £ 250 000.

In the first year the house price increased by 2%

In the second year the house price increased by 2%

In the third year the house price depreciated by 5%

Work out the value of the house at the end of 3 years.

(Total for question 3 is 3 marks)

4 Leigh-Anne invests £ 1500 for 3 years in a saving account.

she gets 2% per annum compound interest.

How much money does Leigh-Anne have at the end of 3 years.

(Total for question 4 is 2 marks)

5 Melvin invests £ 4000 in an account paying 1.5% compound interest per annum.

Charlie invests £ 3500 in an account paying 2% compound interest per annum.

Work out the difference between the amount of money Malvin has after 5 years and the amount of money Charlie has after 5 years.

(Total for question 5 is 4 marks)

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- 6 Jesy bought a new car for £18 000.
In the first year the value of the car depreciates by 30%.
In the second and the third year the car depreciates by 12%.
Work out the value of the car after 3 years.

(Total for question 6 is 3 marks)

- 7 Rose invests £2000 for n years in a savings account.
To find the value, V , of her investment after n years she uses the formula;

$$V=2000 \times (1.035)^n$$

- a) Write down the annual rate of interest Rose earns.

- b) Find the **total amount of interest** Rose earns in two years.

(Total for question 7 is 3 marks)

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8 Daisy bought a new car.

Each year the car depreciates in value by 15%.

Work out the number of years it takes for the car to half in value.

(Total for question 8 is 3 marks)

9 Jade bought a house for £ 255 000.

In the first year the house price increased by 4%

In the second year the house price increased by 5%

In the third year the house price depreciated by 15%

Work out the value of the house at the end of 3 years.

(Total for question 9 is 3 marks)

10 Watson invests £ 6000 in an account paying 2.5% compound interest per annum.

Jacob invests £ 3000 in an account paying 3% compound interest per annum.

Work out the difference between the amount of money Watson has after 4 years and the amount of money Jacob has after 4 years.

(Total for question 10 is 4 marks)

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- 11 Alice invests £ 600 on 1st january 2023 at a compound interest rate of R% per annum. To find the value,V, of her investment after n years is given by the formula;

$$V=600 \times (1.045)^n$$

- a) Write down the annual rate of interest Alice earns.

- b) Use your calculator to find the value of her investment after 10 years.

(Total for question 11 is 3 marks)

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- 12 Lilly invests £ 4000 in an account paying 2% compound interest per annum.
Rosy invests £ 5000 in an account paying 3% compound interest per annum.

Work out the difference between the amount of money Lilly has after 3 years and the amount of money Rosy has after 3 years.

(Total for question 12 is 4 marks)