

8300

GCSE MATHEMATICS

Foundation tier – Questions by Topic

Number

Compound interest calculations

v1.0

Name _____

Materials

For this paper you must have:

- Mathematical instruments

Information

- The marks for questions are shown in brackets

Advice

- In all calculations, show clearly how you work out your answer

For questions 1 to 2 you must **NOT** use a calculator.



Q1.

House prices rise at a rate of 10% each year.
In January 2020, Greta bought a house for £200 000
What is the value of the house in January 2022?

(Total 2 marks)

Q2.

A ball is dropped from a height of 50 metres.
After each bounce, the ball reaches 20% of its previous height.
How high does it reach after the second bounce?

(Total 2 marks)

For the rest of the questions, you may use a calculator.



Q3.

House prices on a street increase by 5.1% each year.
Show that after 14 years the house prices on the street will be at least double.

(Total 2 marks)

Q4.

The number of hedgehogs in England is expected to **reduce** by 4% each year.
Assume there are now 1 000 000 hedgehogs in England.
Work out the expected number of hedgehogs in England after **five** years.
You **must** show your working.

(Total 3 marks)

Q5.

The value of a second-hand car is £9000
Each year it loses 20% of its value at the start of that year.
Work out its value in four years time.

(Total 3 marks)

Q6.

Daniel invests £2500 for 3 years.
The compound interest rate is 2.9% per year.
(a) Which calculation works out the total value after 3 years?
Circle your answer.

$$\begin{array}{l} £2500 \times 1.029 \times 3 \\ £2500 \times 2.9^3 \end{array}$$

$$\begin{array}{l} £2500 \times 2.9 \times 3 \\ £2500 \times 1.029^3 \end{array}$$

(1)

(b) Anna invests £2500 for 3 years. The interest rate is
3.5% for the first year
2.3% for the second year onwards.
Whose investment is worth more after 3 years?
You **must** show your working.

(4)

(Total 5 marks)

Q7.

£6000 is invested at 2.5% compound interest.

(a) Show that the value of the investment after 2 years is £6303.75

(2)

(b) In the third year the interest rate falls to 2.4%

In the fourth year the interest rate falls to 2.35%

Will the interest for year 4 be more or less than the interest for year 3?

Tick a box.

More ☐

Less ☐

You **must** show your working.

(4)

(Total 6 marks)

Q8.

Mia wants to borrow £6000 and repay it, with interest, after two years.

She sees two offers for loans.

Offer 1

Compound interest
3% per year

Offer 2

Compound interest
First year 1%
Second year 5%

Mia says,

“I will pay back the same amount because the average of 1% and 5% is 3%”

Is she correct?

You **must** show your working.

(Total 3 marks)

Q9.

The value of a house is £120 000.

The value is expected to increase by 5% each year.

Work out the expected value after 4 years.

Give your answer to 2 significant figures.

You **must** show your working.

(Total 4 marks)

Q10.

Investment A Save £150 per month for 2 years.

2.5% interest is added to the total amount saved.

Investment B Invest £3500

Compound interest is added at 3% per year.

After 2 years, how much **more** is investment B worth than investment A?

(Total 4 marks)

Q11.

Doug owes an amount of £600

He wants to pay back this amount in five months.

He says, “Each month, I will pay back 20% of the amount I still owe.”

Show working to check if his method is correct.

(Total 3 marks)

Q12.

The value of a second-hand car is £8000
 Each year it loses 20% of its value at the start of that year.
 Work out its value in 5 years time.

(Total 3 marks)**Q13.**

Dev invests £1500 for 2 years.
 The compound interest rate is 1.6% per year.

- (a) Which calculation works out the total value after 2 years?
 Circle your answer.

$£1500 \times 1.6 \times 2$	$£1500 \times 1.6^2$
$£1500 \times 1.016 \times 2$	$£1500 \times 1.016^2$

(1)

- (b) Emma invests £1500 for 2 years.
 The interest rate is
 1.8% for the first year
 1.3% for the second year.
 Whose investment is worth more after 2 years?
 You **must** show your working.

(4)**(Total 5 marks)****Q14.**

£4000 is invested at 1.5% compound interest.

- (a) Show that the value of the investment after 2 years is £4120.90
- (b) In the third year the interest rate falls to 1.4%
 In the fourth year the interest rate falls to 1.35%
 Will the interest for year 4 be more or less than the interest for year 3?
 Tick a box.

(2)☐

More

☐

Less

You **must** show your working.

(4)**(Total 6 marks)****Q15.**

The pressure at sea level is 101 325 Pascals.
 Any rise of 1 km above sea level decreases the pressure by 14%
 For example,
 at 3 km above sea level the pressure is 14% less than at 2 km
 Work out the pressure at 4 km above sea level.
 Give your answer to 2 significant figures.

(Total 4 marks)