

Name: \_\_\_\_\_

## GCSE (1 – 9)

# Compound Interest and Depreciation

### Instructions

- Use **black** ink or ball-point pen.
- Answer all Questions.
- Answer the Questions in the spaces provided  
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

### Information

- The marks for each Question are shown in brackets  
– *use this as a guide as to how much time to spend on each Question.*

### Advice

- Read each Question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every Question.
- Check your answers if you have time at the end

- 1 Jesy invests £8000 for  $n$  years in a savings account.

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

$$V = 8000 \times (1.025)^n$$

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

..... 2.5% .....

(1)

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

$$8000 \times 1.025^3 = £8615.13$$

$$8615.13 - 8000$$

£..... 615.13 .....

(2)

(Total for question 1 is 3 marks)

- 2 Perrie invests £25000 for 3 years in a savings account.  
She gets 2.7% per annum compound interest.

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

$$25000 \times 1.027^3 = 27080.17$$

$$27080.17 - 25000 = £2080.17$$

£..... 2080.17 .....

(Total for question 2 is 3 marks)

3 Jade bought a house for £250 000.

In the first year the house price increased by 3%

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.

$$350\,000 \times 1.03 \times 1.02 \times 0.95$$

$$= \text{£ } 349\,324.50$$

£ 349 324.50

(Total for question 3 is 3 marks)

4 Leigh-Anne invests £2500 for 4 years in a savings account.  
She gets 3% per annum compound interest.

How much money does Leigh-Anne have at the end of 4 years.

$$2500 \times 1.03^4 = \text{£ } 2813.77$$

£ 2813.77

(Total for question 4 is 2 marks)

- 5 Annie invests £9500 for 5 years in a savings account.  
She gets 1.8% per annum compound interest.

How much money does Annie have at the end of 5 years.

$$9500 \times 1.018^5 = £10386.34$$

£.....10386.34.....

(Total for question 5 is 2 marks)

- 6 Greg bought a new car for £18000.  
In the first year the value of the car depreciates by 30%.  
In the second year and the third year the car depreciates by 14%

Work out the value of the car after three years.

$$18000 \times 0.7 \times 0.86^2 = £9318.96$$

£.....9318.96.....

(Total for question 6 is 3 marks)

- 7 Nick 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.

$$0.88^2 = 0.7744$$

$$0.88^3 = 0.681472$$

$$0.88^4 = 0.59969536$$

$$0.88^5 = 0.5277319168$$

$$0.88^6 = 0.464404868 \quad [\text{less than } 0.5]$$

.....6.....years

(Total for question 7 is 3 marks)

- 8 Fearnie invests £5600 in a savings account.  
She gets 2% per annum compound interest.

After  $n$  years, Fearnie has £6061.62 in her account.  
Work out the value of  $n$ .

$$5600 \times 1.02^3 = \frac{5942.76}{\cancel{6119.27}}$$

$$5600 \times 1.02^4 = 6061.62 \quad \checkmark$$

.....4.....  
(Total for question 8 is 2 marks)

9 Alice is going to invest some money for 5 years.

She can choose from ~~of~~ two options:

Investment A: 2.7% compound interest per annum

Investment B: 2.8% simple interest per annum

Which investment should Alice choose

You must show your working.

A

$$100 \times 1.027^5 = 114.2$$

Increase of 14.2%

B

$$2.8 \times 5 = 14$$

Increase of 14%

She should choose Investment A

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(Total for question 9 is 4 marks)

- 10 Matt wants to invest £8000 for three years. He can choose between Bank A and Bank B.

**Bank A**

1.2% compound interest  
per annum

**Bank B**

2% compound interest in  
the first year  
1% compound interest  
for each extra year

Which bank will give Matt the most interest after three years.  
You must show your working.

A

$$\begin{aligned} & \cancel{8000 \times 1.02^3} \\ & 8000 \times 1.012^3 \\ & = \pounds 8291.47 \end{aligned}$$

B

$$\begin{aligned} & 8000 \times 1.02 \times 1.01^2 \\ & = \pounds 8324.02 \end{aligned}$$

Bank B

(Total for question 10 is 4 marks)

11 Melvin invests £5000 in an account paying 2.5% compound interest per annum.

Charlie invests £4500 in an account paying 3% compound interest per annum.

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

$$\text{Melvin: } 5000 \times 1.025^5 = 5657.04$$

$$\text{Charlie: } 4500 \times 1.03^5 = 5216.73$$

$$5657.04 - 5216.73$$

$$= 440.31$$

£.....440.31.....

(Total for question 11 is 4 marks)