

# Compound growth and decay problems

Grade 6 | Higher | 27 questions, 96 marks

GCSE Maths topic practice



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- 1 Hollie puts £8000 into a savings account.  
The value of the account increases by 5% each year.  
Work out the value of the account after 2 years.

(3 marks)

Answer \_\_\_\_\_

- 2 Ben buys a car for £16 000.  
The value of the car depreciates by 15% each year.  
Work out the value of the car at the end of 2 years.

(2 marks)

Answer \_\_\_\_\_

- 3 Dev buys a van for £15 000.  
The value of the van depreciates by 12% each year.  
Calculate the value of the van at the end of 3 years.  
Give your answer to the nearest penny.

(3 marks)

Answer \_\_\_\_\_

- 4 The number of visitors to a website increases by 50% one month and then increases by 50% again the next month.  
Petra says, "Two increases of 50% make an increase of 100%."  
Petra is wrong.  
Find the overall percentage increase over the two months.

(3 marks)

Answer \_\_\_\_\_

- 5** The population of a colony of seabirds falls by the same percentage each year.  
Three years ago the population was 64 000.  
The population is now 46 656.  
Find the annual percentage decrease.

(3 marks)

Answer \_\_\_\_\_

- 6** Aisha invests £2500 in a savings account.  
The account pays 4% compound interest each year.  
Work out the amount in the account after 2 years.

(2 marks)

Answer \_\_\_\_\_

- 7** A delivery van is bought for £24 500.  
Its value depreciates by 18% each year.  
Work out the value of the van at the end of 3 years. Give your answer to the nearest pound.

(3 marks)

Answer \_\_\_\_\_

- 8** Ellis invests £4000 in a savings account for 3 years.  
The account pays compound interest at an annual rate of  
3% for the first year  
2.5% for each of the second and third years.  
Work out the value of the investment at the end of 3 years.  
Give your answer to the nearest penny.

(4 marks)

Answer \_\_\_\_\_

- 9** Freya buys a motorbike for £7200.  
Its value depreciates by 12% each year.  
Show that the value of the motorbike at the end of 3 years is less than £5000. (3 marks)

Answer \_\_\_\_\_

- 10** At the start of an experiment there are 20 000 bacteria in a dish.  
The number of bacteria increases by 8% each hour.  
A scientist claims there will be more than 25 000 bacteria after 3 hours.  
Work out whether the scientist is correct.  
You must show your working. (3 marks)

Answer \_\_\_\_\_

- 11** Mateusz invests £6000 for 3 years at 3% per year compound interest.  
Work out the total interest he earns.  
Give your answer to the nearest penny. (3 marks)

Answer \_\_\_\_\_

- 12** Chloe invests £4000 in a bank account.  
The interest rate is 2.5% in the first year and 1.5% in the second year.  
Work out the amount in the account at the end of the second year. (3 marks)

Answer \_\_\_\_\_

- 13** Rhys buys shares worth £1200. The value of the shares increases by 6% each year.  
Sana buys shares worth £1250. The value of her shares increases by 3% each year.  
After 2 years, whose shares are worth more? Show your working. (3 marks)

Answer \_\_\_\_\_

- 14** The number of bacteria,  $N$ , in a culture after  $t$  hours is given by

$$N = 500 \times 1.6^t$$

- a. Write down the number of bacteria at the start.  
b. Work out the number of bacteria after 4 hours. Give your answer to the nearest whole number.

(3 marks)

Answer \_\_\_\_\_

- 15** Ibrahim puts £1500 into an account that pays 2% compound interest each year.  
He leaves the money in the account for 4 years.

Work out how much interest he earns in total. Give your answer to the nearest penny.

(4 marks)

Answer \_\_\_\_\_

- 16** A running club has 800 members.

The number of members increases by 15% each year.

Find the number of complete years it takes for the number of members to first exceed 1600.

(4 marks)

Answer \_\_\_\_\_

- 17** The population of a town is growing by 12% each year.

Find the number of complete years it will take for the population to become more than double its current size.

(3 marks)

Answer \_\_\_\_\_

**18** Naomi has £8000 to invest for 3 years. She can choose one of two accounts.

**Account A:** 3.5% compound interest each year.

**Account B:** 2% in the first year, then 4.5% in each of the next two years.

Which account gives Naomi more money after 3 years, and by how much?

(4 marks)

Answer \_\_\_\_\_

**19** There are 200 bacteria in a dish at the start of an experiment.

The number of bacteria increases by 25% every hour.

Find the smallest whole number of hours after which there are more than 1000 bacteria.

You must show your working.

(4 marks)

Answer \_\_\_\_\_

**20** Femi invests £2000 for 3 years.

The interest rate is 3% in the first year and 2.5% in the second year.

At the end of the third year the account has £2195.96.

Work out the interest rate in the third year.

(4 marks)

Answer \_\_\_\_\_

**21** Ava invests £6000 at a rate of  $x\%$  compound interest per year.

At the end of 2 years the investment is worth £6615.

Work out the value of  $x$ .

(4 marks)

Answer \_\_\_\_\_

- 22** Town A has a population of 150 000. Its population is falling by 4% each year.  
Town B has a population of 120 000. Its population is rising by 5% each year.  
Work out which town will have the larger population at the end of 3 years.  
You must show your working.

(4 marks)

Answer \_\_\_\_\_

- 23** The value of a painting increased by 10% each year for two years.  
The painting is now worth £9680.  
Find the value of the painting two years ago.

(4 marks)

Answer \_\_\_\_\_

- 24** Mo puts some money in an account that pays 4% compound interest each year.  
At the end of the first year, after the interest is added, he takes out £500.  
At the end of the second year there is £3806.40 in the account.  
How much did Mo put in at the start?

(4 marks)

Answer \_\_\_\_\_

- 25** Lena put money in a savings account. The interest rate was 5% in the first year and 3% in the second year.

After 2 years the account had £3244.50.

- Work out how much Lena put in at the start.
- How much would she have had after 2 years if the rate had been 4% in both years?

(5 marks)

Answer \_\_\_\_\_

- 26** Dan put money in account A, which pays 4% compound interest each year. After 2 years it had £5408.

Emma put £4800 in account B, which pays 5% compound interest each year.

- How much did Dan put in at the start?
- After 2 years, who has earned more interest, and by how much?

(5 marks)

Answer \_\_\_\_\_

- 27** Kira invests £8000 in an account paying 5% compound interest per year.

At the end of 2 years she uses all the money in the account to buy a car.

The value of the car depreciates by  $d\%$  each year.

Exactly 2 years after she buys it, the car is worth £5644.80.

Work out the value of  $d$ .

(6 marks)

Answer \_\_\_\_\_

End of questions | Total 96 marks