

# GCSE Maths: Compound interest, growth and decay (Higher): answers

GCSE Maths - Percentages - Higher - Lesson 5.8

**Answers.** Final answers to the worksheet questions. Full step-by-step solutions for every question are free at [websink.site/gcse/maths/ch05-percentages/higher/compound-interest-growth-and-decay/](https://websink.site/gcse/maths/ch05-percentages/higher/compound-interest-growth-and-decay/)

## Exercise 5M Compound interest, growth and decay Calculator allowed

**1** Work out the total amount in each case. Give your answers to the nearest penny.

- (a) £1,000 at 5% per year for 2 years

**Answer:** £1,102.50

- (b) £2,000 at 3% per year for 3 years

**Answer:** £2,185.45

- (c) £5,000 at 4% per year for 2 years

**Answer:** £5,408

- (d) £800 at 2% per year for 3 years

**Answer:** £848.97

- (e) £1,500 at 6% per year for 2 years

**Answer:** £1,685.40

- (f) £10,000 at 1.5% per year for 4 years

**Answer:** £10,613.64

**2** Work out the compound interest earned in each case.

- (a) £4,000 at 2.5% per year for 2 years

**Answer:** £202.50

- (b) £6,000 at 3% per year for 2 years

**Answer:** £365.40

- (c) £2,500 at 4% per year for 3 years

**Answer:** £312.16

**3** Eve invests £3,000 for 3 years at 4% compound interest per year.

- (a) Work out the total amount at the end of 3 years.

**Answer:** £3,374.59

- (b) Work out the compound interest she earns.

**Answer:** £374.59

**4** Hiba invests £2,000 for 3 years at 4% per year. Work out how much more interest she gets if the interest is compound interest rather than simple interest.

**Answer:** £9.73

- 5** A town has a population of 25,000. It grows by 3% each year. Work out the population after 4 years, to the nearest whole number.

**Answer:** 28,138

- 6** A scientist starts with 500 bacteria. The number of bacteria increases by 20% every hour. Estimate the number after 5 hours, to the nearest whole number.

**Answer:** 1,244

- 7** A car is worth £14,000 when new. It loses 15% of its value every year.

- (a) Work out the value of the car after 3 years.

**Answer:** £8,597.75

- (b) Work out the value of the car after 5 years.

**Answer:** £6,211.87

- 8** A new phone costs £800. It loses 25% of its value each year. Work out its value after 2 years. Work year by year.

**Answer:** £450

- 9** Joe says, "£1,000 at 10% compound interest for 2 years gives the same as 20% simple interest, because  $10\% + 10\% = 20\%$ ." Is he right? Work out both totals.

**Answer:** No. £1,210 and £1,200

- 10** Dan wants to work out the value of £1,000 after 3 years at 5% compound interest. He writes:  $1,000 \times 1.15 = £1,150$ . Explain his mistake and work out the correct value.

**Answer:** £1,157.63

- 11** Work out each amount. Give your answers to the nearest penny or nearest whole number as appropriate.

- (a) £8,500 at 2.8% compound interest per year for 6 years

**Answer:** £10,031.77

- (b) A forest of 14,500 trees that decreases by 3.2% each year, after 7 years

**Answer:** 11,548

- (c) A bike worth £640 that loses 18.5% each year, after 4 years

**Answer:** £282.36

- 12** A bank pays interest of 2% every six months, added to the account each time. Work out the total in the account after 2 years when £10,000 is invested. (Hint: how many six-month periods are there in 2 years?)

**Answer:** £10,824.32

- 13** £1,000 is invested at 5% compound interest per year. Show that the interest earned in year 2 is £52.50. Explain why it is more than the interest in year 1.

**Answer:** £52.50

## Exercise 5N Growth and decay: years, rates and starting amounts

Calculator allowed

**1 Find the smallest whole number of years in each case.**

- (a) £1,000 invested at 4% compound interest per year: first year it is worth more than £1,500

**Answer:** 11 years

- (b) £5,000 invested at 3% compound interest per year: first year it is worth more than £6,000

**Answer:** 7 years

- (c) A £20,000 machine loses 12% of its value each year: first year it is worth less than £10,000

**Answer:** 6 years

**2 Work out the yearly percentage rate in each case.**

- (a) £3,000 grows to £5,184 in 3 years

**Answer:** 20% per year

- (b) £2,500 grows to £3,025 in 2 years

**Answer:** 10% per year

- (c) £16,000 falls to £12,960 in 2 years

**Answer:** 10% per year

**3 Work out the starting amount in each case.**

- (a) After 3 years at 10% growth per year the amount is £6,655

**Answer:** £5,000

- (b) After 2 years at 5% decrease per year the value is £9,025

**Answer:** £10,000

- (c) After 4 years at 20% growth per year the amount is £10,368

**Answer:** £5,000

**4 The interest rates on an account are 4% in year 1, 3% in year 2 and 2.5% in year 3. Work out the total after 3 years when £5,000 is invested.**

**Answer:** £5,489.90

**5 A sample of a radioactive substance has a mass of 80 g. Its mass decreases by 15% every day. Work out its mass after 4 days, correct to 2 decimal places.**

**Answer:** 41.76 g

**6 A savings account pays 8% compound interest per year. Show that the money more than doubles in 10 years.**

**Answer:**  $1.08^{10} = 2.159... > 2$

**7 The population of a country grows by 2% each year. Priya says, "It will double in 35 years." Use a calculator to show that she is nearly right but not quite.**

**Answer:**  $1.02^{35} = 1.9999...,$  just under 2