

REPEATED PERCENTAGE CHANGE

- In many situations, percentages are applied to quantities over many years. Mortgages, savings and investments and depreciation involve percentages applied for 10 years or more.

Example

A car was bought for £12000 in 1998. Each year it depreciates in value by 20%. What is the car worth 5 years later?

Answer

Method 1

After each year, the car is worth 100% – 20% = 80% of its last value.

80% = 0.8

Find 80% of the value first, then work out the value year by year.

Year 1	0.8	x	£ 12,000.00	=	£ 9,600.00
Year 2	0.8	x	£ 9,600.00	=	£ 7,680.00
Year 3	0.8	x	£ 7,680.00	=	£ 6,144.00
Year 4	0.8	x	£ 6,144.00	=	£ 4,915.20
Year 5	0.8	x	£ 4,915.20	=	£ 3,932.16

Method 2

Use the **scale factor** method

Value after 5 years = $(0.8)^5 \times 12000 = £3932.16$

EXAMPLE

A £120000 house increases its value by 15% each year. How much will the house be worth in 4 years ?

Answer

Method 1

After each year, the house will be worth
 100% + 15% = 115%
 of its last value.

115% = 1.15

Year 1	1.15	x	120000	=	138000
Year 2	1.15	x	138000	=	158700
Year 3	1.15	x	158700	=	182505
Year 4	1.15	x	182505	=	209881

Method 2

Value after 4 years = $(1.15)^4 \times 120000 = £209881$

EXERCISE

1. A car which was bought in 2010 for £17000, depreciates in value by 10% each year. How much will the car be worth in 3 years ?
2. A house was worth £78000 in 2003. Its value rose by 13% each year. How much was the house worth in 2008 ?
3. Jenny bought a flat in 1996 for £56000. For the first two years, its value decreased by 10% each year. During the next three years its value increased by 12% each year. How much was the flat worth in 2001?
4. If you bought a car today for £24000 and you know that it will depreciate in value by 15% each year, when would the car be worth less than half of its present value?