Learning Objective 1: To understand compound interest

Learning Objective 2: To explore exponential growth and decay with respect to percentage change using the multiplicative method for percentages

Part 1: non-calculator

a) Timothy invests £200 with a compound interest rate of 10%. Find how much he has after

1 year	2 years	3 years

b) Samantha invests £5000 with a compound interest rate of 5%. Sally thinks she will have £5500 after two years. Explain the error which she has made and work out how much she will have

Part 2: Explain what the following calculations work out in percentage terms

1.02×2000	1.27×300	1.43×20
0.85×33	0.77×102	1.132×80

Part 3: calculator allowed. For the following you only need to round to 2 decimal places.

a) Paul invests £100. The growth is 8% per annum. Copy and complete the following table to show how much he will have in the required years

Year	0	1	2	3	4	5	6	30
amount	£100							

Draw a graph to show the amount of money he has in the first 6 years

Can you find out how long it will be before he has 1 million pounds?

b) Sally invests £3000. Her money increases by 3% for the first 5 years, and then decreases by 3% for the next 5 years. Copy and complete this table

Year	0	1	2	3	4	5	6	7	8	9	10
amount	3000										

Draw a graph to show her money for the first 10 years.

Sally reckons that there has been a mistake and that her money should return to £3000 exactly. Can you explain why here money does not return to £3000?

c) Gareth invests £500 with an interest rate of 4% for 50 years. James invests £810 with an interest rate of 3% for 50 years. Who will have the most money and by how much?
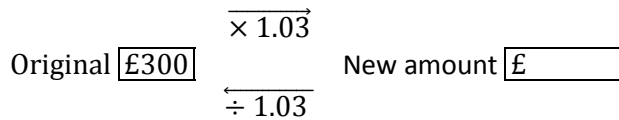
Learning Objective 1: To understand Reverse Percentages by considering inverse operations

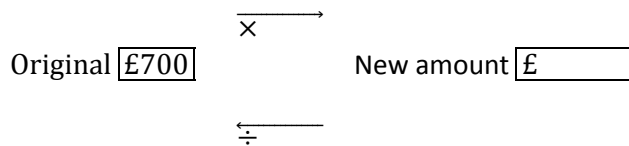Learning Objective 2: To solve problems involving Reverse percentages

Class activity
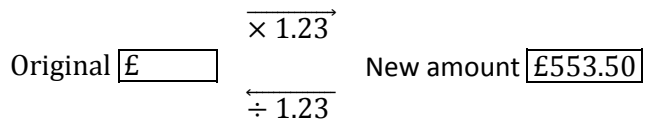
Complete the following flow-diagrams
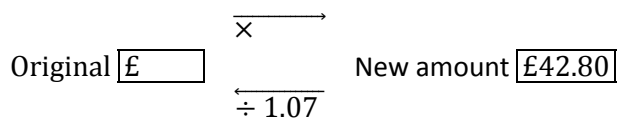
Increase £300 by 3%

$\xrightarrow{\times 1.03}$

Original £300   New amount £ _____

$\xleftarrow{\div 1.03}$

Increase £700 by 11%

$\xrightarrow{\times \quad}$

Original £700   New amount £ _____

$\xleftarrow{\div \quad}$

Increase _____ by 23%

$\xrightarrow{\times 1.23}$

Original £ _____   New amount £553.50

$\xleftarrow{\div 1.23}$

Increase £ ___ by ___ %

$\xrightarrow{\times \quad}$

Original £ _____   New amount £42.80

$\xleftarrow{\div 1.07}$

Decrease £520 by 14%

$\xrightarrow{\times \quad}$

Original £520   New amount £ _____

$\xleftarrow{\div \quad}$
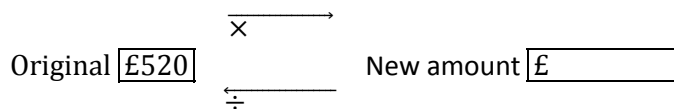
Problems involving reverse percentages

You may find it useful to draw flow diagrams to help at first

Part 1: Find the original amount in the following four questions

1) An original amount is increased by 7% and it is now £449.40
2) An original amount is increased by 22% and it is now 366kg
3) An original amount is decreased by 14% and it is now 653.6miles
4) An original amount is decreased by 3% and it is now 24.25 metres

Part 2: Adapting to wordy-style problems

1) Jack's wage increases by 17% and it is now £16380. How much did he earn before?
2) Father Christmas eats lots of mince pies over Christmas and he now weighs 245.1kg after putting on 14%. What did he weigh before Christmas?
3) A company advertise successfully and increase their number of clientele by 27% to get up to 9017 people. What was the number of clientele did it have before the advertisement feature?
4) The number of people in a town went down by 43% so that there are now only 20520 people. How many were there before?
5) A TV has 17% knocked off in a sale so that is now on sale for £365.20. How much was it originally on sale for?
6) After VAT is added at 17.5% a car costs £25850. What is the price without VAT added and so what is the VAT surcharge?

Part 3: Reversing multiple increases and/or decreases

1) Over 5 years Timothy invests some money at 5% per year. He now has £382.88. How much did he originally invest?
2) A ball is dropped from an unknown height and every time it bounces it loses 20% of its height. After 3 bounces it reaches a height of 5.12 metres. What height was it dropped from?
3) An antique was purchased for an unknown amount. It went up by 3% in the first year, 4% in the second year. 2% for three years and then dropped in value by 7% for three years. It is now worth £3291.72. How much did it originally sell for?