

## Y9 Maths Knowledge Organiser Topic 5: Percentages 3

<p><b>What must I be able to do?</b></p> <p>You may need to revise the following:</p> <ul style="list-style-type: none"> <li>• <a href="#">Year 8 Topic 13: Percentages 2</a></li> <li>• <a href="#">Year 7 Topic 11: Percentages 1</a></li> </ul> <p><b>New content:</b></p> <ul style="list-style-type: none"> <li>□ Calculate simple interest and compound interest             <ul style="list-style-type: none"> <li>➤ Sparx U533, U332</li> </ul> </li> </ul>	<p><b>Key vocabulary</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 30%;"><b>Simple interest</b></td> <td>Interest is calculated once and remains the same amount for each period (e.g. year) and then added on.</td> </tr> <tr> <td><b>Compound interest</b></td> <td>Interest is <u>re-calculated each period</u> (e.g. year) from the <u>new total</u> amount and added on.</td> </tr> <tr> <td><b>Depreciation</b></td> <td>A <u>decrease</u> in the value of something over time.</td> </tr> </table>	<b>Simple interest</b>	Interest is calculated once and remains the same amount for each period (e.g. year) and then added on.	<b>Compound interest</b>	Interest is <u>re-calculated each period</u> (e.g. year) from the <u>new total</u> amount and added on.	<b>Depreciation</b>	A <u>decrease</u> in the value of something over time.
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### Increasing and decreasing by a percentage using multipliers

The starting value is always 100%. An increase takes it over 100% and a decrease takes it below 100%. Change the new percentage to a decimal to find the multiplier.

e.g. Increase £210 by 15%.  $100\% + 15\% = 115\%$ . 115% as a decimal is 1.15. So  $£210 \times 1.15 = £241.50$

e.g. Decrease £210 by 15%.  $100\% - 15\% = 85\%$ . 85% as a decimal is 0.85. So  $£210 \times 0.85 = £178.50$

### Simple and compound interest

Viv wants to invest £2000 for 4 years in the same bank. At the end of 4 years, Viv wants to have as much money as possible. Which bank should she invest her £2000 in?

Option A

The International Bank

Compound Interest

6% for the first year

2% interest for each extra year

Option B

The Friendly Bank

Simple interest

3% each year

Option A

6% interest is 106% so 1.06 as a multiplier

2% interest is 102% so 1.02 as a multiplier

$$2000 \times 1.06 \times 1.02^3 = £2249.76$$



Power of 3 as it is 3 years at 2%

$$1.02 \times 1.02 \times 1.02 = 1.02^3$$

Option B

Simple interest so 3% of 2000 =  $0.03 \times 2000 = £60$

$£60 \times 4 \text{ years} = £240$

$$£2000 + £240 = £2240$$

The International Bank will give more money after 4 years

### Working backwards with compound interest

e.g. Simon invests £3500 at  $y\%$  a year compound interest for 4 years. After 4 years he has £4254.27. Calculate the value of  $y$ .

Using multipliers:  $3500 \times ?^4 = 4254.27$

$$?^4 = \frac{4254.27}{3500} = 1.215505714$$

Note this is a 4<sup>th</sup> root, not a square root as we need to undo a power of 4.

$$? = \sqrt[4]{1.215505714} = 1.049999884 = 1.05 \text{ to 2d.p.}$$

1.05 is 105% as a percentage.

This is a 5% increase on 100% so  $y = 5\%$ .