# Y9 Maths Knowledge Organiser Topic 5: Percentages 3

| What must I be able to do? | Key vocabulary | |
|---|---|---|
| **You may need to revise the following:**<br>• Year 8 Topic 13: Percentages 2<br>• Year 7 Topic 12: Percentages 1<br>**New content:**<br>☐ Calculate simple interest and compound interest<br>➢ Sparx U533, U332 | **Simple interest** | Interest is calculated once and remains the same amount for each period (e.g. year) and then added on. |
| | **Compound interest** | Interest is re-calculated each period (e.g. year) from the new total amount and added on. |
| | **Depreciation** | A decrease in the value of something over time. |
| | **Appreciation** | An increase in value over time. |

## 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 x 1.15 = £241.50

e.g. Decrease £210 by 15% 100% - 15% = 85% 85% as a decimal is 0.85. So £210 x 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 x 2000 = £60

£60 x 4 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 4th 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%.