YEAR 10 – PROPORTION...

Percentages and Interest

What do I need to be able to do?

By the end of this unit you should be able to:

- Convert and compare FDP
- Work out percentages of amounts
- Increase/ decrease by a given percentage
- Express one number as a percentage
- Calculate simple and compound interest
- Calculate repeated percentage change
- Find the original value
- Solve problems with growth and decay

Keywords

Exponent: how many times we use a number in multiplication. It is written as a power
Compound interest: calculating interest on both the amount plus previous interest
Depreciation: a decrease in the value of something over time.
Growth: where a value increases in proportion to its current value such as doubling.
Decay: the process of reducing an amount by a consistent percentage rate over time.
Multiplier: the number you are multiplying by
Equivalent: of equal value.

Compare FDP (R)

Comparisons are easier in the same format

$\frac{70}{100}$ → This also means 70 ÷ 100 → 70 out of 100 squares → 70 "hundredths" = 7 "tenths" = 0.7 → 70 hundredths = 70%

Using a calculator

$\frac{\square}{\square}$ → S⇔D Convert to a decimal

This will give you the answer in the simplest form

× 100 converts to a percentage

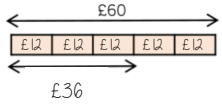
Be careful of recurring decimals

e.g. $\frac{1}{3}$ = 0.3333333 = $0.\dot{3}$

The dot above the 3

Fraction/ Percentage of amount (R)

Find $\frac{3}{5}$ of £60



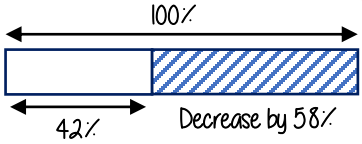
Remember $\frac{3}{5}$ = 60%

10% of £60 = £6
50% of £60 = £30
60% of £60 = £36

Remember $\frac{3}{5}$ = 60% = 0.6

60% of £60
= 0.6 × 60
= £36

Percentage increase/decrease (R)

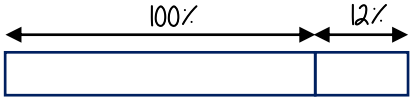


Decrease by 58%

100% − 58% = 42%

100 − 0.58 = 0.42

Multiplier: Less than 1



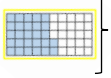
Increase by 12%

100% + 12% = 112%

100 + 0.12 = 1.12

Multiplier: More than 1

Express as a percentage (R)



27 per every 50 shaded → $\frac{27}{50}$

54 per every 100 shaded → $\frac{54}{100}$

54%

$\frac{13}{30}$ → $\frac{\square}{\square}$ → $\frac{13}{30}$ → × 100

43.3333...%

43%

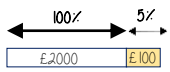
Can't use equivalence easily to find 'per hundred'

Decimal percentages are still a percentage

Simple and compound interest

Simple Interest

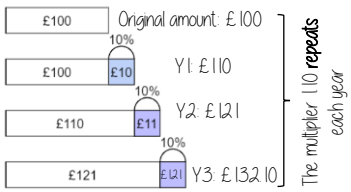
James invests £2000 at 5% simple interest



The original value increases by this amount every year

Compound Interest

Tess invests £100 at 10% compound interest for 3 years



Repeated percentage change

Compound Interest

Tess invests £100 at 10% compound interest for 3 years

£100 × 1.10 × 1.10 × 1.10

£100 × 1.10^3

Original amount; Repeated multiplier; Number of occurrences

Depreciation

Depreciation calculations use multipliers **less than** 1

Multipliers are commutative – an overall multiplier effect can be calculated by combining the multipliers separately

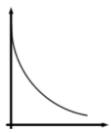
e.g. Increase of 10% then a reduction of 10%

× 1.10 × 0.9 = × 0.99 The multiplier

Growth and decay

Compound growth

Compound decay



Compound growth and compound decay are exponential graphs

Decay – the values get closer to 0
The constant multiplier is less than one

Growth – the values increase exponentially
The constant multiplier is more than one

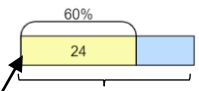
Find the original value

Percentage calculations

Original amount × Multiplier = Final Value

In a test Lucy scored 60% of her questions correctly. Her score was 24. How many questions were on the test.

Original × 0.6 = 24



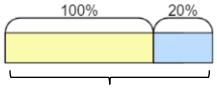
24 ÷ 0.6 = 40 marks

10% = 6

100% = 40

Total questions on test

A car sold for a profit £3000 with a profit of 20%. How much was the car originally?



Original × 1.2 = 3000

120% = £3000
10% = £250
100% = £2500