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**

□/□ → 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

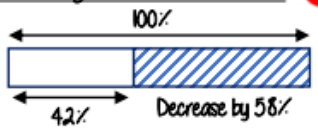
Remember $\frac{3}{5}$ = 60%

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

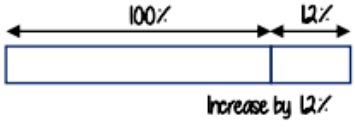
Remember
$\frac{3}{5}$ = 60% = 0.6

60% of £60
= 0.6 × 60
= £36

Percentage increase/decrease (R)



100% − 58% = 42%
100 − 0.58 = 0.42
Multiplier Less than 1



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%

$\frac{13}{30}$ → □/□ → $\frac{13}{30}$ → × 100

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

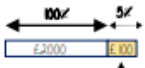
43.3333...%
43%

Decimal percentages are still a percentage

Simple and compound interest

Simple Interest

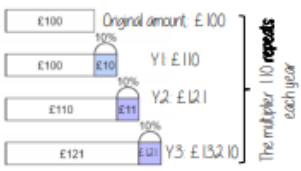
James invests £2000 at 5% simple interest



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

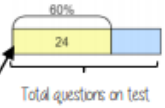
Find the original value

Percentage calculations

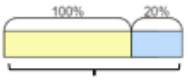
Original amount × **Multiplier** = **Final Value**

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



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