

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.

70/100 → This also means 70 - 100 → 70 out of 100 squares → 70 "hundredths" = 7 "tenths" = 0.7 → 70 hundredths = 70%

Using a calculator → $\frac{70}{100}$ → S-D → Convert to a decimal → $\times 100$ converts to a percentage

This will give you the answer in the simplest form

Be careful of recurring decimals
eg $\frac{1}{3} = 0.3333333$
 $\frac{3}{10} = 0.3$
The dot above the 3

Fraction/ Percentage of amount

R

Find $\frac{3}{5}$ of £60

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

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

Remember $\frac{3}{5} = 60\% = 0.6$
60% of £60 = $0.6 \times 60 = £36$

Percentage increase/decrease

R

100% → 42% → Decrease by 58% → $100\% - 58\% = 42\%$
 $100 - 58 = 42$ → Multiplier Less than 1

100% → 12% → Increase by 12% → $100\% + 12\% = 112\%$
 $100 + 12 = 112$ → Multiplier More than 1

Express as a percentage

R

27 per every 50 shaded → $\frac{27}{50}$ → $\frac{13}{30}$ → $\frac{13}{30} \times 100 = 43.3333...%$ → 43%

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

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 → $\frac{100\%}{5\%} = 20$ → £100 → The original value increases by this amount every year

Compound Interest
Tess invests £100 at 10% compound interest for 3 years → The multiplier 1.10 repeats each year

Original amount: £100
Y1: £110
Y2: £121
Y3: £133.10

Repeated percentage change

Compound Interest
Tess invests £100 at 10% compound interest for 3 years → $\text{£100} \times 1.10 \times 1.10 \times 1.10$

Depreciation
Depreciation calculations use multipliers less than 1
Multipliers are commutative - an overall multiplier effect can be calculated by combining the multipliers separately.
eg increase of 10% then a reduction of 10% → $\times 1.10 \times 0.9$ → The multiplier $\times 0.99$

Growth and decay

Compound growth → Exponential growth graph

Compound decay → Exponential decay graph

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 \times 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 $\times 0.6 = 24$ → $24 \div 0.6 = 40$ marks
Total questions on test = 40

A car sold for a profit £3000 with a profit of 20%. How much was the car originally?
Original $\times 1.2 = 3000$ → $3000 \div 1.2 = 2500$