Higher Unit 4— Fractions, ratio and percentages

Key point 1

The **reciprocal** of the number n is $\frac{1}{n}$. You can also write this as n^{-1}.

Key point 2

It is often easier to write mixed numbers as improper fractions before doing a calculation.

Example 1

Work out $4\frac{1}{2} - 1\frac{4}{5}$

$4\frac{1}{2} - 1\frac{4}{5} = \frac{9}{2} - \frac{9}{5}$ — Write both numbers as improper fractions.

$= \frac{45}{10} - \frac{18}{10}$ — Write both fractions with a common denominator.

$= \frac{27}{10}$

$= 2\frac{7}{10}$ — Write the answer as a mixed number.

Example 2

Share £126 between Lu and Katie in the ratio 2:5.

2 + 5 = 7 parts — Find out how many parts there are in total.

1 part = £126 ÷ 7 = £18 — Find out how much one part is worth.

Lu: 2 × £18 = £36

Katie: 5 × £18 = £90 — Find 2 parts and 5 parts.

Check: £36 + £90 = £126 ✓

Key point 3

You can compare ratios by writing them as **unit ratios**. In a unit ratio, one of the numbers is 1.

Key point 4

When two quantities are in **direct proportion**, as one is multiplied by a number, n, so is the other.

Key point 5

Simple interest is the interest calculated only on the original amount invested. It is the same each year.

Key point 6

You can calculate a percentage change using the formula

$$\text{percentage change} = \frac{\text{actual change}}{\text{original amount}} \times 100$$

Key point 7

$$\text{Percentage loss (or profit)} = \frac{\text{actual loss (or profit)}}{\text{original amount}} \times 100$$

Key point 8

You can use inverse operations to find the original amount after a percentage increase or decrease.

Example 3

In one year, the value of a car dropped by 12% to £9240.
How much was the car worth at the start of the year?

100% − 12% = 88% = 0.88

Original number → ×0.88 → 9240

9240 → ÷0.88 → 10500 — Draw a function machine

The car was worth £10 500 at the start of the year.

Example 4

Write $0.\dot{3}$ as a fraction.

$0.\dot{3} = 0.333333333\ldots = n$ — Call the recurring decimal n.

so $10n = 3.333333333\ldots$ — Multiply the recurring decimal by 10 to shift the sequence one place left.

$10n - n = 3.333333333\ldots - 0.333333333\ldots$

$= 3.000000000\ldots$ — Subtract the value of n from the value of $10n$. This makes all the numbers after the decimal point 0.

$9n = 3$

$n = \frac{3}{9}$ — Solve the equation.

$n = \frac{1}{3}$ — Simplify the fraction if possible.

Key point 9

All recurring decimals can be written as exact fractions.

If 1 decimal place recurs, multiply by 10.
If 2 decimal places recur, multiply by 100.
If 3 decimal places recur, multiply by 1000.

communication hint

Depreciates means loses value.

communication hint

Your **income** means the amount of money you earn or are paid, and 'per annum' (abbreviated to p.a.) means each year.

Exam hint

Read one sentence at a time and decide what calculation you need to do.