

Exercise walk-through

C1.4

Fractions, decimals and percentages

IGCSE Mathematics

You must be able to

- Convert mixed numbers, decimals and percentages
- Simplify fractions using common factors
- Express a part as a fraction or percentage of a whole

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The method

Method — Key knowledge: Fractions, decimals and percentages

A proper fraction is less than 1; an improper fraction has numerator at least as large as its denominator. Divide numerator and denominator by the same common factor to simplify. Convert a mixed number using $(\text{whole} \times \text{denominator} + \text{numerator}) / \text{denominator}$. A decimal is a fraction with a power-of-ten denominator. Percentage means out of 100.

Exercises 2.1·2.3

2.1 Simplify $24/36$. [2]

2.2 Convert $2\frac{2}{5}$ to an improper fraction and a decimal. [2]

2.3 Write 0.32 as a simplified fraction and a percentage. [2]

Exercises 2.1·2.3

2.1 Simplify $24/36$. [2]

2.1

- The common factor is 12: $F = (24 \div 12)/(36 \div 12) = \mathbf{2/3}$.

2.2 Convert $2\frac{2}{5}$ to an improper fraction and a decimal. [2]

2.2

- $F = (2 \times 5 + 2)/5 = \mathbf{12/5}$; $D = 12 \div 5 = \mathbf{2.4}$.

2.3 Write 0.32 as a simplified fraction and a percentage. [2]

2.3

- $F = 32/100 = \mathbf{8/25}$; $p = 0.32 \times 100 = \mathbf{32\%}$.

Exercise 2.4

2.4 Convert $\frac{7}{8}$ to a decimal and a percentage.

[2]

3 Exam-style questions

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2.4 Convert $7/8$ to a decimal and a percentage.

[2]

3 Exam-style questions

2.4

- $D = 7 \div 8 = \mathbf{0.875}$; $p = 0.875 \times 100 = \mathbf{87.5\%}$.

Exercise 3.1 (a)

3.1 Apply the fractions, decimals and percentages methods below. Show working and include units where appropriate.

(a) A bottle holds $1\frac{1}{5}$ litres. Write its capacity as a decimal.

[2]

Exercise 3.1 (a)

3.1 Apply the fractions, decimals and percentages methods below. Show working and include units where appropriate.

(a) A bottle holds $1\frac{1}{5}$ litres. Write its capacity as a decimal. [2]

(a)

- $V = (1 \times 5 + 1)/5 = 6/5 = \mathbf{1.2}$ litres.

Exercise 3.1 (b)

3.1 Apply the fractions, decimals and percentages methods below. Show working and include units where appropriate.

(b) Write 0.3 litres as a simplified fraction of a litre.

[2]

Exercise 3.1 (b)

3.1 Apply the fractions, decimals and percentages methods below. Show working and include units where appropriate.

(b) Write 0.3 litres as a simplified fraction of a litre.

[2]

(b)

- $V = 3/10$ litre, already simplified: $3/10$ **litre**.

Exercise 3.1 (c)

3.1 Apply the fractions, decimals and percentages methods below. Show working and include units where appropriate.

(c) What percentage of the full bottle is 0.3 litres?

[2]

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3.1 Apply the fractions, decimals and percentages methods below. Show working and include units where appropriate.

(c) What percentage of the full bottle is 0.3 litres?

[2]

(c)

- $p = (0.3/1.2) \times 100 = \mathbf{25\%}$.

Exercise 3.2 (a)

3.2 A bottle contains 1.5 litres of juice. A serving uses 0.225 litres.

(a) Express one serving as a simplified fraction and a percentage of the bottle. [3]

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(a)

- Use $f = \text{serving/whole} = 0.225/1.5 = \mathbf{3/20}$.
- Percentage $p = 100f = \mathbf{15\%}$.

Exercise 3.2 (b)

3.2 A bottle contains 1.5 litres of juice. A serving uses 0.225 litres.

(b) Six servings are poured. Find the fraction of the original bottle remaining and its volume. [3]

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(b)

- Six servings use $f_u = 6(3/20) = 9/10$, so the fraction left is $f_r = 1 - 9/10 = \mathbf{1/10}$.
- Volume $V = 1.5(1/10) = \mathbf{0.15}$ litres.