

Exercise walk-through

C1.6

The four operations

IGCSE Mathematics

You must be able to

- Apply the order of operations with signed numbers
- Calculate exactly with fractions and mixed numbers
- Interpret a calculation and check its size

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The method

Method — Key knowledge: The four operations

Do brackets first, then powers, then multiplication and division from left to right, then addition and subtraction. Adding a negative decreases a value; subtracting a negative increases it. For fractions, use a common denominator to add or subtract. Multiply numerators and denominators; to divide, multiply by the reciprocal. Convert mixed numbers before calculating.

Exercises 2.1·2.3

2.1 Calculate $-8 + 5$ and $-3 \times (-4)$. [2]

2.2 Calculate $18 - 2(3 + 4)$. [2]

2.3 Calculate $5/6 - 1/4$. [2]

Exercises 2.1·2.3

2.1 Calculate $-8 + 5$ and $-3 \times (-4)$. [2]

2.1

- $Q = -8 + 5 = -3$; two negative factors give $P = \mathbf{12}$.

2.2 Calculate $18 - 2(3 + 4)$. [2]

2.2

- Brackets first: $Q = 18 - 2(7) = 18 - 14 = 4$.

2.3 Calculate $5/6 - 1/4$. [2]

2.3

- Use denominator 12: $Q = 10/12 - 3/12 = \mathbf{7/12}$.

Exercise 2.4

2.4 Calculate $2.4 \times 0.5 + 0.36 \div 0.6$.

[2]

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[2]

2.4

- Multiply and divide first: $Q = 1.2 + 0.6 = \mathbf{1.8}$.

Exercise 3.1 (a)

3.1 Apply the the four operations methods below. Show working and include units where appropriate.

(a) The temperature is -7°C and rises by 12°C . Find the new temperature. [2]

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(a)

- $T = -7 + 12 = 5^{\circ}\text{C}.$

Exercise 3.1 (b)

3.1 Apply the the four operations methods below. Show working and include units where appropriate.

(b) It then falls by 8°C . Find the final temperature.

[2]

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(b) It then falls by 8°C . Find the final temperature.

[2]

(b)

- $T = 5 - 8 = -\mathbf{3}^{\circ}\text{C}.$

Exercise 3.1 (c)

3.1 Apply the the four operations methods below. Show working and include units where appropriate.

(c) A recipe uses $\frac{3}{4}$ kg flour for one batch. Find the flour needed for $2\frac{1}{2}$ batches. [2]

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(c)

- $F = (\frac{3}{4})(\frac{5}{2}) = \frac{15}{8} = 1\frac{7}{8} \text{ kg.}$

Exercise 3.2 (a)

3.2 A baker has $4\frac{1}{2}$ kg of flour. Each cake uses $\frac{3}{8}$ kg.

(a) Find the maximum number of whole cakes the baker can make.

[3]

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[3]

(a)

- Use $N = \text{total}/\text{per cake}$.
- $N = (9/2) \div (3/8) = (9/2)(8/3) = \mathbf{12}$.
- There is no fraction of a cake or flour left at this maximum.

Exercise 3.2 (b)

3.2 A baker has $4\frac{1}{2}$ kg of flour. Each cake uses $\frac{3}{8}$ kg.

(b) The baker makes 10 cakes, then receives another $\frac{3}{4}$ kg of flour. Find the new amount of flour and the number of further whole cakes possible. [3]

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(b)

- Flour left after ten cakes: $m = 9/2 - 10(3/8) = 3/4$ kg.
- New flour $m_n = 3/4 + 3/4 = \mathbf{3/2}$ kg.
- Further cakes $N = (3/2) \div (3/8) = \mathbf{4}$.