

Exercise walk-through

C2.1

Introduction to algebra

IGCSE Mathematics

You must be able to

- Translate a situation into an expression or formula
- Substitute signed and fractional values carefully
- Explain the difference between fixed and variable costs

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The method

Method — Key knowledge: Introduction to algebra

Letters stand for numbers. $3x$ means $3 \times x$, while x^2 means $x \times x$. Substitute each value in brackets, especially a negative value, then follow the order of operations. Distinguish an expression, which has no equals sign, from an equation. Build an expression by translating the operations in the stated order.

Exercises 2.1·2.3

2.1 Find $4x + 7$ when $x = 3$.

[2]

2.2 Find $p^2 + q$ when $p = -5$ and $q = 6$.

[2]

2.3 Find $(a + b)/c$ when $a = 8$, $b = -2$, $c = 3$.

[2]

Exercises 2.1·2.3

2.1 Find $4x + 7$ when $x = 3$.

[2]

2.1

- $Q = 4(3) + 7 = \mathbf{19}.$

2.2 Find $p^2 + q$ when $p = -5$ and $q = 6$.

[2]

2.2

- $Q = (-5)^2 + 6 = 25 + 6 = \mathbf{31}.$

2.3 Find $(a + b)/c$ when $a = 8, b = -2, c = 3$.

[2]

2.3

- $Q = (8 - 2)/3 = 6/3 = \mathbf{2}.$

Exercise 2.4

2.4 Write an expression for five less than twice n .

[2]

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[2]

2.4

- Double first then subtract 5: $2n - 5$.

Exercise 3.1 (a)

3.1 Apply the introduction to algebra methods below. Show working and include units where appropriate.

(a) A hall charges 40 yuan plus 12 yuan per hour. Write a formula for the cost C for h hours. [2]

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(a)

- Fixed cost plus hourly cost: $C = 40 + 12h$.

Exercise 3.1 (b)

3.1 Apply the introduction to algebra methods below. Show working and include units where appropriate.

(b) Find the cost for 3.5 hours.

[2]

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(b) Find the cost for 3.5 hours.

[2]

(b)

- $C = 40 + 12(3.5) = \mathbf{82}$ yuan.

Exercise 3.1 (c)

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(c) A student writes $C = 52h$. Explain the mistake, using the cost for one hour and for two hours. [2]

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(c)

- The fixed 40 yuan is charged once. One hour costs 52 yuan, but two cost $C = 40 + 24 = 64$, **not 104 yuan**.

Exercise 3.2 (a)

3.2 A delivery company charges 25 yuan per order and 4 yuan for each parcel. There are n parcels in one order.

(a) Write a formula for the total cost C and find the cost of an order with 7 parcels. [3]

Exercise 3.2 (a)

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(a) Write a formula for the total cost C and find the cost of an order with 7 parcels. [3]

(a)

- Fixed plus variable cost gives $C = \mathbf{25} + \mathbf{4n}$.
- At $n = 7$, $C = 25 + 4(7)$, so $C = \mathbf{53}$ yuan.

Exercise 3.2 (b)

3.2 A delivery company charges 25 yuan per order and 4 yuan for each parcel. There are n parcels in one order.

(b) Two orders contain 3 and 4 parcels respectively. Find their combined cost and explain why it differs from the single 7-parcel order. [3]

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(b)

- Two orders: $T = (25 + 4(3)) + (25 + 4(4))$, giving $T = \mathbf{78}$ yuan.
- The extra **25 yuan** is a second fixed charge, not an extra parcel charge.