

Exercise walk-through

C2.5

Equations

IGCSE Mathematics

You must be able to

- Construct and solve linear and simultaneous equations
- Check solutions in the original situation
- Rearrange a simple formula with the subject appearing once

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The method

Method — Key knowledge: Equations

Write an equation by making two equal quantities equal. Solve a linear equation by doing the same operation to both sides; expand brackets first if needed. For simultaneous equations, eliminate one unknown, solve the other, then substitute back. To change the subject of a simple formula, undo operations in reverse order. Check solutions in the original equations.

Exercises 2.1·2.3

2.1 Solve $4x - 7 = 13$.

[2]

2.2 Solve $3(x + 2) = 21$.

[2]

2.3 Make x the subject of $y = 5x - 4$.

[2]

Exercises 2.1·2.3

2.1 Solve $4x - 7 = 13$.

[2]

2.1

- Add 7: $4x = 20$; divide by 4: $x = 5$.

2.2 Solve $3(x + 2) = 21$.

[2]

2.2

- Divide by 3: $x + 2 = 7$; subtract 2: $x = 5$.

2.3 Make x the subject of $y = 5x - 4$.

[2]

2.3

- Add 4, then divide by 5: $x = (y + 4)/5$.

Exercise 2.4

2.4 Solve $a + b = 11$ and $a - b = 5$.

[2]

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[2]

2.4

- Add: $2a = 16$, so $a = 8$. Substitute: $b = 3$.

Exercise 3.1 (a)

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

(a) Two adult tickets and one child ticket cost 31 yuan. One adult ticket and two child tickets cost 26 yuan. Write equations for adult price a and child price c . [2]

Exercise 3.1 (a)

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

(a) Two adult tickets and one child ticket cost 31 yuan. One adult ticket and two child tickets cost 26 yuan. Write equations for adult price a and child price c . [2]

(a)

- $2a + c = 31$ and $a + 2c = 26$.

Exercise 3.1 (b)

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

(b) Find the adult ticket price.

[2]

Exercise 3.1 (b)

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

(b) Find the adult ticket price.

[2]

(b)

- Double the second: $2a + 4c = 52$. Subtract the first: $3c = 21$, so $c = 7$. Then $2a = 24$ and $a = 12$ **yuan**.

Exercise 3.1 (c)

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

(c) Find the child ticket price and check both totals.

[2]

Exercise 3.1 (c)

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

(c) Find the child ticket price and check both totals.

[2]

(c)

- $c = 7$ **yuan**. Checks: $2(12) + 7 = 31$ and $12 + 2(7) = 26$.

Exercise 3.2 (a)

3.2 A notebook and two pens cost 19 yuan. Two notebooks and one pen cost 26 yuan. Let notebook price be n and pen price be p .

(a) Form two equations and find both prices.

[3]

Exercise 3.2 (a)

3.2 A notebook and two pens cost 19 yuan. Two notebooks and one pen cost 26 yuan. Let notebook price be n and pen price be p .

(a) Form two equations and find both prices.

[3]

(a)

- $n + 2p = 19$ and $2n + p = 26$.
- Eliminate to obtain $3p = 12$, so $p = 4$, $n = 11$ yuan.
- Check: $11 + 8 = 19$ and $22 + 4 = 26$.

Exercise 3.2 (b)

3.2 A notebook and two pens cost 19 yuan. Two notebooks and one pen cost 26 yuan. Let notebook price be n and pen price be p .

(b) The charge for delivery is $C = 8 + 3d$, where d is distance in km. Rearrange for d and find the distance when $C = 29$ yuan. [3]

Exercise 3.2 (b)

3.2 A notebook and two pens cost 19 yuan. Two notebooks and one pen cost 26 yuan. Let notebook price be n and pen price be p .

(b) The charge for delivery is $C = 8 + 3d$, where d is distance in km. Rearrange for d and find the distance when $C = 29$ yuan. [3]

(b)

- Subtract the fixed charge: $3d = C - 8$.
- Thus $d = (C - 8)/3$.
- At $C = 29$, $d = (29 - 8)/3 = 7$ km.