

Exercise walk-through

C2.6

Inequalities

IGCSE Mathematics

You must be able to

- Interpret strict and inclusive inequality symbols
- List integer values in a given interval
- Represent intervals with open or filled endpoints

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The method

Method — Key knowledge: Inequalities

An inequality describes a range. $<$ and $>$ exclude the boundary; $\leq$ and $\geq$ include it. On a number line use an open circle for exclusion and a filled circle for inclusion. Shade the values that satisfy the statement. Read a combined interval as two conditions that must both be true. Core requires representing and interpreting inequalities.

Exercises 2.1·2.3

2.1 Write an inequality for a temperature T below 4°C . [2]

2.2 Write an inequality for a mass m of at least 12 kg. [2]

2.3 List the integers satisfying $-1 < x \leq 3$. [2]

Exercises 2.1·2.3

2.1 Write an inequality for a temperature T below 4°C . [2]

2.1

- Below excludes equality: $T < 4$ (in degrees Celsius).
-

2.2 Write an inequality for a mass m of at least 12 kg. [2]

2.2

- At least includes the endpoint: $m \geq 12$ (in kg).
-

2.3 List the integers satisfying $-1 < x \leq 3$. [2]

2.3

- Exclude -1 and include 3: 0, 1, 2, 3.

Exercise 2.4

2.4 Draw a number line for $1 \leq x < 4$, labelling the endpoints.

[2]

3 Exam-style questions

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[2]

3 Exam-style questions

2.4

- **Filled circle at 1, open circle at 4, segment between.** These show which endpoints belong.

Exercise 3.1 (a)

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

(a) A parcel accepts masses $2 \leq m < 5$ kg. State whether 2 kg and 5 kg are accepted. [2]

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(a)

- **2 kg is accepted; 5 kg is not** because the upper inequality is strict.

Exercise 3.1 (b)

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

(b) List all whole-number masses that are accepted.

[2]

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

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[2]

(b)

- **2, 3 and 4 kg** are the whole-number values inside the interval.

Exercise 3.1 (c)

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

(c) Draw a number line for the allowed interval.

[2]

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(c) Draw a number line for the allowed interval.

[2]

(c)

- **Filled circle at 2, open at 5, shade between.**

Exercise 3.2 (a)

3.2 A ride accepts heights $120 \leq h < 150$ cm. A sports group accepts ages $11 < a \leq 15$ years.

(a) Decide whether heights 120, 149.9 and 150 cm qualify, giving the reason for the two boundary heights. [3]

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(a) Decide whether heights 120, 149.9 and 150 cm qualify, giving the reason for the two boundary heights. [3]

(a)

- 120 and 149.9 cm qualify.
- 150 cm does not.
- The $\leq$ includes 120, while $<$ excludes 150.

Exercise 3.2 (b)

3.2 A ride accepts heights $120 \leq h < 150$ cm. A sports group accepts ages $11 < a \leq 15$ years.

(b) List the accepted whole-number ages and draw their interval on a number line. [3]

Exercise 3.2 (b)

3.2 A ride accepts heights $120 \leq h < 150$ cm. A sports group accepts ages $11 < a \leq 15$ years.

(b) List the accepted whole-number ages and draw their interval on a number line. [3]

(b)

- The integer ages are **12, 13, 14, 15**.
- Use an **open point at 11** and **filled point at 15**, shading the segment between them.