

Exercise walk-through

C1.5

Ordering

IGCSE Mathematics

You must be able to

- Order signed numbers and unlike numerical forms
- Use comparison symbols including equality
- Interpret thresholds in a real context

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The method

Method — Key knowledge: Ordering

To order numbers, compare them in the same form. A number further right on a number line is greater. For negative numbers, a larger size can mean a smaller value: $-8 < -3$. $\leq$ and $\geq$ include equality; $<$ and $>$ do not. $\neq$ means not equal.

Exercises 2.1-2.3

2.1 Order $-7, 2, -3, 0$ from smallest to largest. [2]

2.2 Insert $<$, $>$ or $=$ between $3/5$ and 0.62 . [2]

2.3 Order $0.48, 45\%, 1/2$ from smallest to largest. [2]

Exercises 2.1·2.3

2.1 Order $-7, 2, -3, 0$ from smallest to largest. [2]

2.1

- Left to right on the number line: $-7, -3, 0, 2$.

2.2 Insert $<$, $>$ or $=$ between $3/5$ and 0.62 . [2]

2.2

- $3/5 = 0.60$, so $3/5 < 0.62$.

2.3 Order $0.48, 45\%, 1/2$ from smallest to largest. [2]

2.3

- Convert to decimals $0.48, 0.45, 0.50$: $45\%, 0.48, 1/2$.

Exercise 2.4

2.4 Write all integers satisfying $-2 \leq x < 3$.

[2]

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- Include -2 but exclude 3 : $-2, -1, 0, 1, 2$.

Exercise 3.1 (a)

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

(a) Order the race times 12.08, 12.8, 12.18 s from fastest to slowest. [2]

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(a)

- Smaller time is faster: **12.08 s, 12.18 s, 12.8 s.**

Exercise 3.1 (b)

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

(b) A qualifying time must be at most 12.18 s. Write this condition using a symbol. [2]

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(b) A qualifying time must be at most 12.18 s. Write this condition using a symbol. [2]

(b)

- At most includes the boundary: $t \leq 12.18$ (time in seconds).

Exercise 3.1 (c)

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

(c) Which of these runners qualify? Explain why equality matters.

[2]

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(c) Which of these runners qualify? Explain why equality matters. [2]

(c)

- **The 12.08 s and 12.18 s runners qualify;** $\leq$ includes the exact limit.

Exercise 3.2 (a)

3.2 Four freezer readings are $-2.05, -2.5, -2.15, -2.005$ °C. The acceptable range is $-2.5 \leq T \leq -2.05$.

(a) Order the readings from coldest to warmest and identify the warmest reading. [3]

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3.2 Four freezer readings are $-2.05, -2.5, -2.15, -2.005$ °C. The acceptable range is $-2.5 \leq T \leq -2.05$.

(a) Order the readings from coldest to warmest and identify the warmest reading. [3]

(a)

- Use equal decimal places to compare.
- Coldest to warmest: **$-2.5, -2.15, -2.05, -2.005$** °C.
- The warmest is **-2.005** °C, nearest to zero.

Exercise 3.2 (b)

3.2 Four freezer readings are -2.05 , -2.5 , -2.15 , -2.005 °C. The acceptable range is $-2.5 \leq T \leq -2.05$.

(b) State which readings are acceptable and explain whether -2.5 °C is included. [3]

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(b)

- Accept **$-2.5, -2.15$ and -2.05** °C.
- Reject **-2.005** °C, which is greater than -2.05 °C.
- The lower endpoint -2.5 °C is included because the symbol is $\leq$.