Exercise walk-through

E4.3
Scale drawings

IGCSE Mathematics

You must be able to

- convert a length on a scale drawing or map into a real distance, and back
- write a bearing as three figures measured clockwise from north
- find the back bearing of a given bearing

1 The method

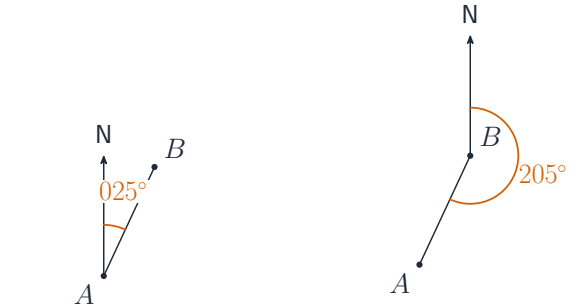
Method — A bearing is three figures, clockwise from north

- **Scale $1 : n$:** real distance $=$ map distance $\times n$. Then convert the units: 6 cm at $1 : 50\,000$ is $300\,000$ cm $= 3$ km.
- **Going the other way, divide.** A real 3 m at a scale of $1 : 25$ is $300 \div 25 = 12$ cm on the model.
- **Bearings have three figures**, always: due east is $090°$, due west is $270°$, and $70°$ is written $070°$.
- **Back bearing:** add $180°$ if the bearing is under $180°$, subtract $180°$ if it is over. The bearing of A from B when B from A is $145°$ is $325°$.

Answer shapes (marked by **method marks** — M1 for a correct method, A1 for the correct answer): the multiplication by the scale is a method mark, and the unit conversion is a separate one.

Method — A bearing is three figures, clockwise from north

Answer shapes (marked by method marks — M1 for a correct method, A1 for the correct answer): the...



Bearing of B from A **Bearing of A from B**

Bearings measured clockwise from north

2 Practice

Practice 2.1 ▪ 3 marks

A map has a scale of $1 : 50\,000$. Two towns are 6 cm apart on the map. Find the real distance between them in kilometres.

Solution 2.1

Method: A bearing is three figures, clockwise from north — p.4

Worked steps

- real distance $= 6 \times 50\,000 = 300\,000$ cm M1 M1
- convert: $\div 100$ for metres, then $\div 1000$ for kilometres

$$= \mathbf{3} \text{ km}$$ A1

Practice 2.2 ▪ 2 marks

The bearing of B from A is $070°$. Find the bearing of A from B.

Solution 2.2

Method: A bearing is three figures, clockwise from north — p.4

Worked steps

- $70 < 180$, so add 180 M1

$$= \mathbf{250}^\circ$$ A1

Practice 2.3 ▪ 1 mark

Write down the three-figure bearing of due west.

Solution 2.3

Method: A bearing is three figures, clockwise from north — p.4

Worked steps

- clockwise from north: east 090, south 180, west

$$= \mathbf{270}^\circ$$ B1

3 Exam-style

Exam-style 3.1 ▪ 4 marks

A model of a building is made to a scale of $1 : 25$.

Exam-style 3.1 (a) ▪ 2 marks

The model is 18 cm long. Find the real length of the building in metres.

Solution 3.1 (a)

Method: A bearing is three figures, clockwise from north — p.4

Worked steps

- real length $= 18 \times 25 = 450$ cm M1

$= \mathbf{4.5}$ m A1

Exam-style 3.1 (b) ▪ 2 marks

The real building is 3 m high. Find the height of the model in centimetres.

Solution 3.1 (b)

Worked steps

- 3 m $= 300$ cm, so the model is $300 \div 25$ M1

$$= \mathbf{12} \text{ cm}$$ A1

Exam-style 3.2 ▪ 4 marks

B is on a bearing of 145° from A.

Exam-style 3.2 (a) ▪ 2 marks

Find the bearing of A from B.

Solution 3.2 (a)

Method: A bearing is three figures, clockwise from north — p.4

Worked steps

- $145 < 180$, so add 180 M1

$$= \mathbf{325}^\circ$$ A1

Exam-style 3.2 (b) ▪ 2 marks

C is due north of A and due west of B. Write down the bearing of C from B.

Solution 3.2 (b)

Worked steps

- C is due WEST of B, so standing at B and turning clockwise from north **M1**

$$= \mathbf{270}^\circ \quad \textbf{A1}$$

- the position of A is not needed for this part — read which point you are standing on