

E4.3 Scale drawings

Name: _____ Class: _____ Date: _____

Total: 14 marks

KEY WORDS scale 比例尺 • bearing 方位角 • back bearing 反方位角 • scale drawing 比例图
• clockwise 顺时针

Objective

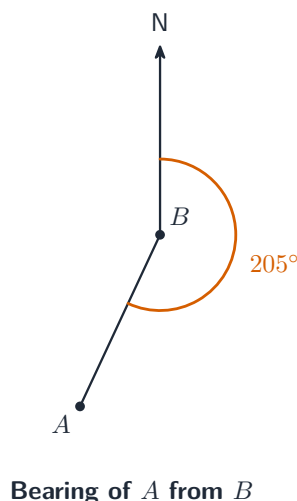
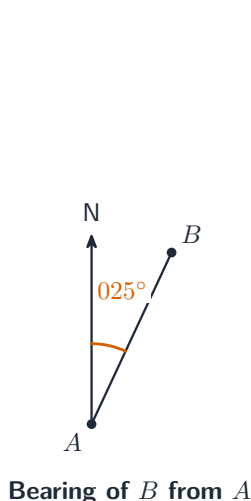
Build the skills to answer Extended exam questions on **scale drawings** 比例图 — converting between a **scale** 比例尺 distance and a real distance, and reading and calculating **three-figure bearings** 三位方位角.

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 Worked examples

- A bearing is three figures, clockwise from north



Always measure from the north line at the point you are standing on

- **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.

2 Practice

2.1 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. [3]

2.2 The bearing of B from A is 070° . Find the bearing of A from B . [2]

2.3 Write down the three-figure bearing of due west. [1]

3 Exam-style questions

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

(a) The model is 18 cm long. Find the real length of the building in metres. [2]

(b) The real building is 3 m high. Find the height of the model in centimetres. [2]

3.2 B is on a bearing of 145° from A .

(a) Find the bearing of A from B . [2]

(b) C is due north of A and due west of B . Write down the bearing of C from B . [2]

Solutions

Marking: **M1** a correct method, **A1** the correct answer.

Each answer shows the steps, then the **result**.

2.1

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

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

2.2

- $70 < 180$, so add 180

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

2.3

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

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

3.1

(a)

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

$$= \mathbf{4.5 \text{ m}}$$

(b)

- $3 \text{ m} = 300 \text{ cm}$, so the model is $300 \div 25$

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

3.2

(a)

- $145 < 180$, so add 180

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

(b)

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

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

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