Unit 20 · Bearing and Scale Drawing

HARDER PRACTICE QUESTIONS · ANSWER KEY

Full marks 27

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Turning on the way

ANSWER A · 3

i. 070° + 90° = **160**°.

ii. 160° + 150° = **310**°.

iii. **North-west** (315° is exactly north-west).

MARKING SCHEME

✓ 160°.

✓ 310°.

✓ About north-west.

2 Two places from one

ANSWER A · 3

i. From 300° round through north to 040°: 60° + 40° = **100**°.

ii. 040° + 180° = **220**°.

iii. 300° − 180° = **120**°.

MARKING SCHEME

✓ 100°.

✓ 220°.

✓ 120°.

3 A right-angled walk

ANSWER HA · 4

i. The bearing of A from B is 050° + 180° = 230°, and the bearing of C from B is 140°. The angle between them is 230° − 140° = 90°.

ii. $AC = \sqrt{6^2 + 8^2} =$ **10 km**.

iii. On the drawing $AB = 3$ cm, $BC = 4$ cm, and $AC = 5$ cm. The bearing of C from A measures about **103**°.

iv. 103° + 180° = about **283**°.

MARKING SCHEME

✓ The angle at B is 230° − 140° = 90°.

✓ 10 km.

✓ About 103° (accept 101° to 105°).

✓ About 283°, the answer to iii. plus 180°.

4 Lengths and areas on a map

ANSWER HA · 3

i. 50,000 cm = 500 m = **0.5 km**.

ii. The field is 1 km by 1.5 km: **1.5 km²**.

iii. The scale is for **lengths**. An area has two lengths, so each cm² on the map stands for 50000 × 50000 cm², not 50,000 cm².

MARKING SCHEME

✓ 0.5 km.

✓ 1.5 km².

✓ The scale must be used twice for an area.

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5 Redraw the plan

ANSWER A · 3

i. $4.5 \times 200 = 900$ cm and $3 \times 200 = 600$ cm: **9 m by 6 m**.
ii. $900 \div 150 = 6$ cm and $600 \div 150 = 4$ cm: **6 cm by 4 cm**.
iii. **Larger**: each centimeter on it now stands for less of the real room.

MARKING SCHEME

- ✓ 9 m by 6 m.
- ✓ 6 cm by 4 cm.
- ✓ Larger, since 1 cm stands for less.

6 Spot the error

ANSWER U · 3

i. A bearing is less than 360°. For 180° or more, take 180° away: **100**°.
ii. A bearing has three digits: **090**°.
iii. A ratio has no units, so the units are the same on both sides: 1 cm stands for **500 cm**, which is 5 m.

MARKING SCHEME

- ✓ i. 100°.
- ✓ ii. 090°.
- ✓ iii. 500 cm, or 5 m.

7 In a real setting

ANSWER A · 4

i. $AB = 5$ cm, with a north line at each end; F is where the two bearing lines cross.
ii. B is on a bearing of 090° from A, so $\angle FAB = 90° - 45° = 45°$. A is on a bearing of 270° from B, so $\angle FBA = 315° - 270° = 45°$. So $\angle AFB = 90°$: a **right-angled isosceles triangle**.
iii. AF measures about 3.5 cm: about **350 m** (by calculation, 354 m).
iv. Half of AB: **250 m**, since a right-angled isosceles triangle's height onto its longest side is half that side.

MARKING SCHEME

- ✓ The drawing.
- ✓ 45°, 45° and 90°: right-angled and isosceles.
- ✓ About 350 m.
- ✓ 250 m.

8 Think

ANSWER HA · 2

The two north lines are **parallel**, and the line joining the two places is a transversal. The bearing there, measured from north at the first place, and the angle measured from south at the second place are alternate angles, so they are equal.
The bearing back is measured from north, which is 180° from south, so it is 180° more (or less).

MARKING SCHEME

- ✓ The north lines are parallel, with the joining line as a transversal.
- ✓ Alternate angles give the angle from the south, so the bearings differ by 180°.

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9 Make your own

ANSWER HA · 2

For example, 5 km on 090°, 5 km on 210°, and 5 km on 330°. The drawing is an equilateral triangle.
Each turn is an exterior angle of the triangle, so each bearing is **120**° more than the last: 360° ÷ 3.

MARKING SCHEME

- ✓ Three bearings that close up, with the drawing.
- ✓ The bearings differ by 120°, an exterior angle of an equilateral triangle.

See it at Science Playground

Exhibits and plants at the center, Bhaktapur, that go with this unit. Book a class visit at science-playground.com/booking.

- **The Compass Rose** (exhibit): Stand at the center facing N, then turn clockwise: NE is a bearing of 045°, E 090°, S 180°, SW 225° and NW 315°.
- **3D Map of Nepal** (exhibit): A scale drawing multiplies every length by one number; this raised map doesn't: its heights are exaggerated, or the Himalayas would be barely a bump.

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	0	3	13	11	**27**

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