

Foundation GCSE: Scale Drawings and Bearings Problems

Name: _____

Class: _____

Instructions: Answer all questions. Questions are ordered from easiest (1) to hardest (15). Working out should be shown where appropriate.

1. A map has a scale of 1 : 1000. Walk 5 cm on a bearing of 090° from a starting point. What is the actual distance walked in metres?
2. On a map with a scale of 1 : 500, town B is located 8 cm from town A on a bearing of 060° . Find the actual distance from A to B in metres.
3. A treasure map has a scale of 1 : 200. From a palm tree, walk 12 cm on a bearing of 270° . State the actual distance in metres and direction.
4. A hiker travels on a scale drawing (1 : 25000) from camp C (2 cm on a bearing of 045°) to a peak. Find the actual distance in kilometres.
5. Two points P and Q are plotted on a map of scale 1 : 20000. Point P is 3 cm North and point Q is 4 cm East of the origin. Find the actual distance between P and Q in kilometres.
6. A pilot flies an aircraft using a chart with a scale of 1 : 500000. On the chart, the distance between airport X and airport Y is 12 cm on a bearing of 135° . Find the actual distance in kilometres.
7. On a scale plan (1 : 100), a surveyor marks a boundary line from point A to point B . Point B is 15 cm away from A on a bearing of 220° . Find the actual distance in metres and the bearing of A from B .
8. An orienteering course requires walking 4 cm on a bearing of 050° , then 3 cm on a bearing of 140° on a map of scale 1 : 1000. Calculate the straight-line distance from start to finish in metres.
9. A model lighthouse is built to a scale of 1 : 250. On a navigation chart (1 : 5000), the distance from the harbor to the lighthouse is 2.4 cm on a bearing of 080° . Find the actual distance in metres.
10. A map drawn to a scale of 1 : 25000 shows a trail starting at S and ending at T . T is located 6.8 cm from S on a bearing of 300° . Calculate the actual distance in kilometres and the bearing of S from T .
11. In a tactical navigation exercise, a drone flies on a bearing of 075° for a map distance of 8 cm (scale 1 : 50000), then turns to a bearing of 165° for 6 cm. Find the total actual distance traveled in kilometres.
12. A field map has a scale of 1 : 2000. Gate A is 10 cm from Gate B on a bearing of 040° . Calculate the actual distance between Gate A and Gate B in metres.
13. Two ships, A and B , are tracked from a radar station. Ship A is at a map distance of 5 cm on a bearing of 050° (scale 1 : 100000). Ship B is at a map distance of 12 cm on a bearing of 140° . Calculate the actual distance between Ship A and Ship B in kilometres.
14. An architect's site plan (1 : 500) shows a foundation peg at P and another at Q . Q is 14 cm from P on a bearing of 240° . A third peg R is located such that angle $PQR = 90^\circ$ and $QR = 4.8$ cm on the plan on a bearing of 330° . Find the actual distance PR in metres.
15. A hiker uses a 1 : 50000 OS map. She walks from stile S to gate G , which is 9.2 cm on the map on a bearing of 110° , then from G to ruin R , which is 5.4 cm on the map on a bearing of 200° . Calculate the direct actual distance from S to R in kilometres.

Answers & Worked Solutions

1. 50 m : $5 \times 10 = 50$ m.
2. 40 m : $8 \times 5 = 40$ m.
3. 24 m on 270° : $12 \text{ cm} \times 200 = 2400 \text{ cm} = 24 \text{ m}$.
4. 0.5 km : $2 \times 25000 = 50000 \text{ cm} = 0.5 \text{ km}$.
5. 1 km : Hypotenuse $5 \text{ cm} \times 20000 = 100000 \text{ cm} = 1 \text{ km}$.
6. 60 km : $12 \times 500000 = 6000000 \text{ cm} = 60 \text{ km}$.
7. 15 m, bearing 040° : $15 \times 100 = 1500 \text{ cm} = 15 \text{ m}$; reverse bearing is $220 - 180 = 040^\circ$.
8. 50 m : Map distance $\sqrt{4^2 + 3^2} = 5 \text{ cm}$; actual = $5000 \text{ cm} = 50 \text{ m}$.
9. 120 m : $2.4 \times 5000 = 12000 \text{ cm} = 120 \text{ m}$.
10. 1.7 km, bearing 120° : $6.8 \times 25000 = 170000 \text{ cm} = 1.7 \text{ km}$; reverse bearing $300 - 180 = 120^\circ$.
11. 7 km : Total map distance $14 \text{ cm} \times 50000 = 700000 \text{ cm} = 7 \text{ km}$.
12. 200 m : $10 \text{ cm} \times 2000 = 20000 \text{ cm} = 200 \text{ m}$.
13. 13 km : Right triangle with sides 5 and 12, hypotenuse $13 \text{ cm} \times 1 \text{ km} = 13 \text{ km}$.
14. 74 m : Hypotenuse $\sqrt{14^2 + 4.8^2} = 14.8 \text{ cm} \times 5 = 74 \text{ m}$.
15. 5.34 km : Hypotenuse $\approx 10.67 \text{ cm} \times 0.5 \text{ km} = 5.34 \text{ km}$.