

Scale drawings and bearings

About 50 minutes No calculator 40 marks

Hints online, answers free with an account:
mathswariz.uk/worksheets/gcse-scale-drawings-and-bearings/

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

- A1** Needed today [2 marks] **A2** Last lesson [2 marks]

Write 5.5 m^2 in cm^2 .

Answer

Each interior angle of a regular polygon is 17 times its exterior angle. How many sides does the polygon have?

Answer

- A3** From chapter 1 [2 marks] **A4** From chapter 6 [2 marks]

Find the smallest positive whole number k such that $180k$ is a cube number.

Answer

The angles of a triangle are $(x + 10)^\circ$, $(3x)^\circ$ and $(2x + 74)^\circ$. Find the size of the largest angle.

Answer

B Example, then your turn

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

A map has a scale of 1 : 80 000. Two villages are 9.5 cm apart on the map. How far apart are they really, in kilometres?

Hint 1 cm on the map is 80 000 cm. There are 100 000 cm in a kilometre.

- B1** A map has a scale of 1 : 60 000. [2 marks]
Two farms are 7.5 cm apart on the map. How far apart are they really, in kilometres?

Answer

EXAMPLE 2The bearing of B from A is 237° . Work out the bearing of A from B .**Hint** The two bearings differ by 180° . Draw a north line at each point.

- B2** The bearing of Q from P is 108° . Work out the bearing of P from Q . [2 marks]

Answer

C Practice

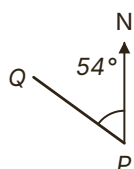
- C1** A map has a scale of 1 cm to 5 km. Two towns are 37 km apart. How far apart are they on the map? [2 marks]

Answer

- C2** A road 12 km long is 4.8 cm long on a map. Write the scale of the map in the form 1 : n . [2 marks]

Answer

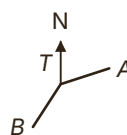
- C3** Write down the bearing of Q from P . [2 marks]



Not drawn accurately

Answer

- C4** From a tower T , ship A is on a bearing of 072° and ship B is on a bearing of 213° . Work out the size of angle ATB . [2 marks]



Not drawn accurately

Answer

- C5** A plan of a house has a scale of 1 : 50. A room is 4.2 m long. How long is it on the plan, in centimetres? [2 marks]

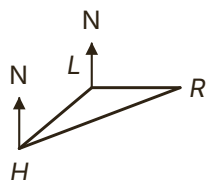
Answer

D Exam-style questions

- D1** A plan has a scale of 1 : 500. A lawn covers 3 cm^2 on the plan. Jo says, "The real lawn is 1500 cm^2 , because the scale multiplies by 500." [3 marks]

Explain why Jo is wrong. Work out the real area of the lawn, in m^2 .

- D2** On a map with a scale of 1 : 400 000, a lighthouse L is 5.5 cm from a harbour H , on a bearing of 050° . A rock R is due east of L . The bearing of R from H is 075° .



Not drawn accurately

- (a) Work out the real distance from H to L , in kilometres. [2 marks]

Answer

- (b) Work out the bearing of H from L . [1 mark]

Answer

- (c) A boat leaves H at 10:40 and sails straight to L at 24 km/h. At what time does it arrive? [2 marks]

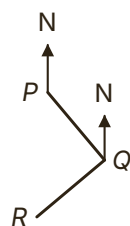
Answer

- (d) Work out the size of angle HRL . You must show your working. [3 marks]

Answer

Total for D2: 8 marks

- D3** A ship sails 18 km from port P on a bearing of 140° to a buoy Q . It then sails 18 km from Q on a bearing of 230° to a rock R . Work out the bearing of R from P . You must show your working. [4 marks]



Not drawn accurately

Answer

E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** Ship A is due north of ship B . From a lighthouse L , the bearing of A is 030° and the bearing of B is 110° . Which ship is nearer to L ? Give a reason. [3 marks]

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Sketch L , A and B , with a north line at L and AB running north to south.
- Hint 2** Angle $ALB = 110 - 30 = 80^\circ$, angle $LAB = 30^\circ$, so angle $LBA = 70^\circ$.
- Hint 3** The shorter side is opposite the smaller angle: compare the sides opposite 30° and 70° .

How did it go?

Colour one circle on each line: not yet, nearly, yes.

- I can use a map scale written as a ratio in both directions. ☐ ☐ ☐
- I can write a three-figure bearing and the bearing back again. ☐ ☐ ☐
- I can use north lines to find angles in a bearings problem. ☐ ☐ ☐