

Bearings

Solutions

For AQA GCSE Mathematics (8300) • Foundation tier

Each question is shown in grey, followed by the working, one step per line. The final answer is in a box. *Marks* shows how the marks are usually given in the exam, and **Tip** points out a common mistake.

1 (3 marks)

- (a) The bearing of C from D is 315°

Circle the direction of C from D .

Options: North-East, South-East, South-West, North-West

Bearings go clockwise from North: North = 000° , East = 090° , South = 180° , West = 270° .

315° is halfway between West (270°) and North (360°).

So C is North-West of D .

Answer: North-West

- (b) Town T is South-West of town S .

Write down the bearing of T from S .

South-West is halfway between South (180°) and West (270°).

$$180 + 45 = 225$$

Answer: 225°

Tip: Always measure clockwise from North. 045° , 225° and 315° are the other three “halfway” directions, so check which one you need.

- (c) The bearing of F from E is 045°

Nina says, “ F is North-West of E .”

Is Nina correct?

Give a reason for your answer.

045° is halfway between North (000°) and East (090°).

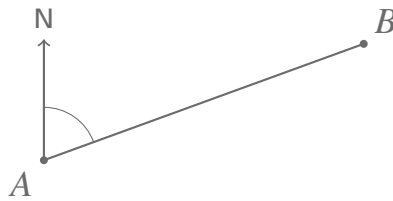
So F is North-East of E .

North-West would be 315° .

Answer: No, 045° is North-East

2 (1 mark)

The diagram shows two points, A and B .



Circle the bearing of B from A .

Options: 070° , 110° , 250° , 290°

A bearing is measured clockwise from North, at the point you are measuring **from** (A).

B is between North and East of A .

So the bearing is less than 090° .

Answer: 070°

3 (2 marks)

The bearing of Q from P is 060°

Work out the bearing of P from Q .

To go back the opposite way, turn through 180° .

The bearing is less than 180° , so add 180° :

$$60 + 180 = 240$$

Answer: 240°

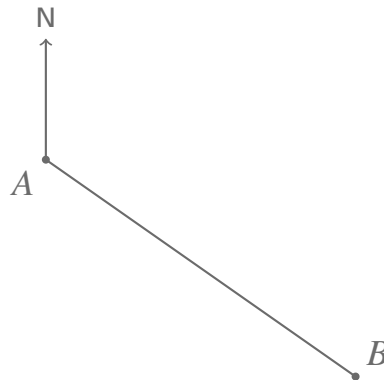
Tip: For a back bearing, add or subtract 180° . Do not subtract from 360° : $360 - 60 = 300$ is wrong. A quick sketch helps.

Marks: 1 mark for $60 + 180$. 1 mark for 240.

4 (3 marks)

The diagram is drawn accurately. It shows two points, A and B .

(a) Measure the bearing of B from A .



Put the centre of the protractor on A , with 0° on the North line.

Measure clockwise from North round to the line AB .

It measures 125° .

Answer: 125° (accept 123 to 127)

(b) The scale of the diagram is 1 cm represents 2 km.
Work out the real distance from A to B .

Measure AB with a ruler: 5 cm.

Each cm represents 2 km.

$$5 \times 2 = 10 \text{ km}$$

Answer: 10 km (accept 9.8 to 10.2)

Marks: 1 mark for measuring 5 cm (4.9 to 5.1) and multiplying by 2. 1 mark for 10.

5 (2 marks)

A ship leaves harbour *H* and sails 8 km on a bearing of 040°



The scale is 1 cm represents 2 km.

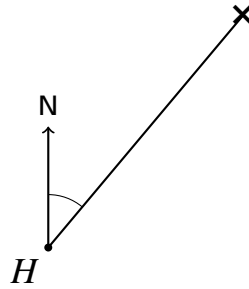
Mark the position of the ship with a cross (×).

Use the scale: $8 \div 2 = 4$, so 8 km is 4 cm.

Put the protractor on *H* and measure 40° clockwise from North.

Draw a line from *H* in this direction.

Mark a cross 4 cm along the line.



Answer: Cross 4 cm from H on a bearing of 040°

Marks: 1 mark for the bearing of 040°. 1 mark for the distance of 4 cm.

6 (2 marks)

A campsite *C* is 250 metres due East of the car park *P*.

A well *W* is North-West of *C*.

W is due North of *P*.

Mark *C* and *W* on the centimetre grid.

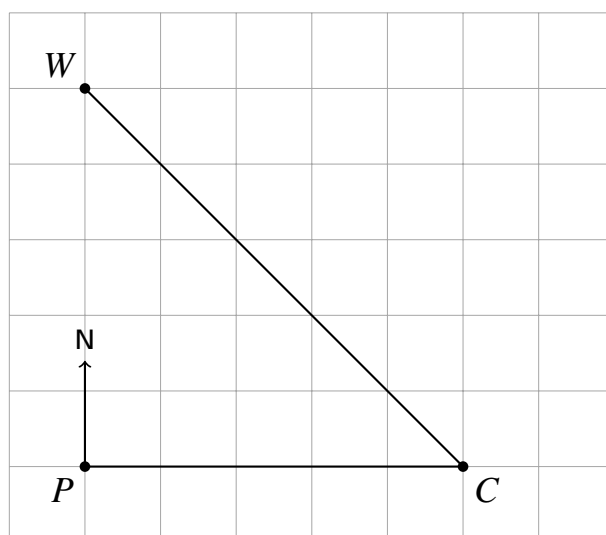
Use a scale of 1 centimetre represents 50 metres.

Use the scale: $250 \div 50 = 5$, so *C* is 5 cm due East of *P*.

North-West of *C* means 45° from North, anticlockwise: along the diagonal of the squares, up and to the left.

W is also due North of *P*, so *W* is where this diagonal meets the North line through *P*.

That is 5 cm due North of *P*.



Answer: C is 5 cm East of P; W is 5 cm North of P

Tip: North-West is along the diagonal of the squares. Start the diagonal from *C*, not from *P*.

Marks: 1 mark for *C* 5 cm due East of *P*. 1 mark for *W* 5 cm due North of *P*.

7 (1 mark)

Tom is measuring the bearing of *A* from *B*.

He measures an angle of 60° anticlockwise from North at *B*.

He says the bearing of *A* from *B* is 060°

Explain the mistake Tom has made.

Bearings are measured **clockwise** from North.

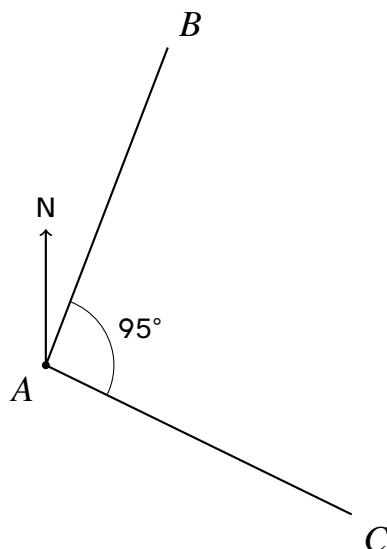
Tom measured anticlockwise.

60° anticlockwise from North is a bearing of $360 - 60 = 300^\circ$.

Answer: Bearings are measured clockwise from North, so it should be 300°

8 (2 marks)

The diagram shows points A , B and C .



Not drawn accurately

The 3-figure bearing of B from A is 021°

Work out the 3-figure bearing of C from A .

The bearing of C is the angle clockwise from North to AC .

This is 21° (North to AB) plus 95° (AB to AC).

$$21 + 95 = 116$$

Answer: 116°

Marks: 1 mark for $21 + 95$. 1 mark for 116.

9 (3 marks)

The bearing of B from A is 050°

The bearing of C from B is 140°

Work out the size of angle ABC .

Draw a sketch with a North line at A and at B .

The bearing of B from A is 050° .

So the bearing of A from B is $50 + 180 = 230^\circ$.

The bearing of C from B is 140° .

Angle ABC is the angle between these two directions at B :

$$230 - 140 = 90^\circ$$

Answer: 90°

Tip: Draw a North line at each point. Angle ABC is at B , so you need both directions measured from B .

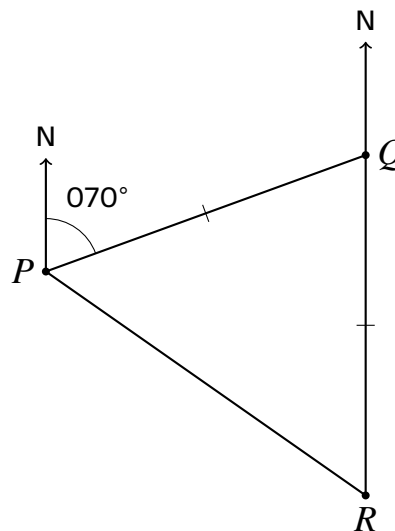
Marks: 1 mark for 230. 1 mark for $230 - 140$. 1 mark for 90.

10 (3 marks)

A yacht sails from port P to a buoy Q on a bearing of 070°

It then sails due South from Q to a lighthouse R .

The distance from Q to R is the same as the distance from P to Q .



Not drawn accurately

Work out the bearing of R from P .

Draw a North line at Q . The bearing of P from Q is $070 + 180 = 250^\circ$.

R is due South of Q , so the bearing of R from Q is 180° .

$$\text{Angle } PQR = 250 - 180 = 70^\circ$$

$PQ = QR$, so triangle PQR is isosceles.

$$\text{The base angles are equal: angle } QPR = (180 - 70) \div 2 = 55^\circ$$

Bearing of R from $P = 070 + 55 = 125^\circ$

Answer: 125°

Tip: Angle PQR is 70° because the North lines at P and Q are parallel (alternate angles). Then use the isosceles triangle.

Marks: 1 mark for angle $PQR = 70^\circ$. 1 mark for 55° . 1 mark for 125.
