PEARSON EDEXCEL INTERNATIONAL GCSE MATHEMATICS A (4MA1) · HIGHER TIER

Bearings and Constructions: exam questions

10 questions · 28 marks · mark schemes at the end

Name _____ Date _____ Score / 28

- Calculators are allowed on both 4MA1 Higher papers (1H and 2H). Show your working: most marks are for method.
- Mark schemes start after the questions. M marks are for a correct method, A marks for an accurate answer that follows a correct method, and B marks for a correct result on its own.
- Online, with more practice: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/bearings-and-constructions

1. **2 marks**

(a) The bearing of B from A is $070°$. Work out the bearing of A from B. **(1)**

(b) The bearing of Q from P is $315°$. Work out the bearing of P from Q. **(1)**

2. **4 marks**

A ship sails 8 km on a bearing of $090°$. It then sails 6 km on a bearing of $180°$.

(a) Work out how far the ship is from its starting point. **(2)**

(b) Work out the bearing of the ship from its starting point. **(2)**

3. **3 marks**

B is 12 km from A on a bearing of $040°$.

Work out how far north and how far east B is from A.

4. **2 marks**

A map is drawn to a scale of 1 cm to 5 km.

(a) Two towns are 7.4 cm apart on the map. How far apart are they? **(1)**

(b) Two villages are 18 km apart. How far apart are they on the map? **(1)**

5. **2 marks**

A and B are two fixed points.

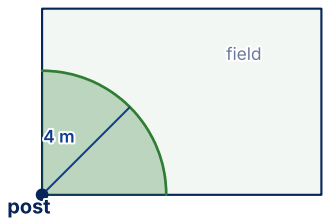
(a) Describe the locus of points that are 3 cm from A. **(1)**

(b) Describe the locus of points that are the same distance from A as from B. **(1)**

6. **2 marks**

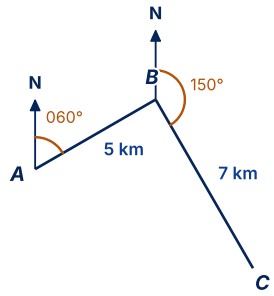
A goat is tied by a rope 4 m long to a post at the corner of a rectangular field. The goat stays inside the field.

Work out the area of grass the goat can reach.



7. **5 marks**

A boat sails 5 km from A to B on a bearing of $060°$. It then sails 7 km from B to C on a bearing of $150°$.



(a) Show that angle $ABC = 90°$. **(1)**

(b) Work out the distance AC. **(2)**

(c) Work out the bearing of C from A. **(2)**

8. **3 marks**

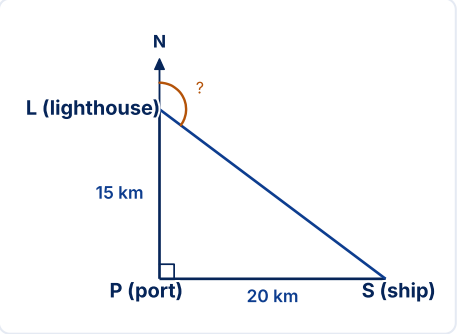
A is the point $(1, 2)$ and B is the point $(5, 6)$. The point P moves so that $PA = PB$.

Find an equation of the locus of P.

9. 3 marks

A lighthouse L is 15 km due north of a port P. A ship S is 20 km due east of P.

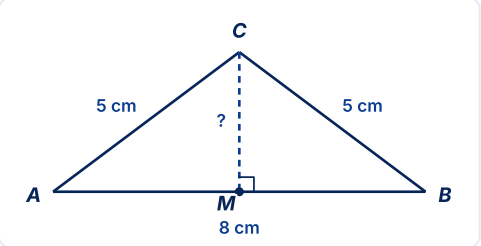
Work out the bearing of S from L.



10. 2 marks

A and B are 8 cm apart. A point C is 5 cm from A and 5 cm from B.

Work out the distance of C from the midpoint of AB.



Answers and worked solutions

Question 1

2 marks

(a)

B1 $250°$

(b)

B1 $135°$

Answer: (a) $250°$; (b) $135°$

Question 2

4 marks

(a)

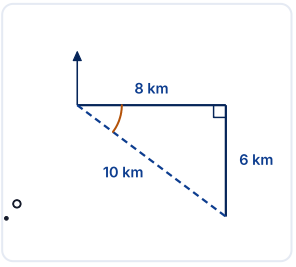
M1 $\sqrt{8^2 + 6^2}$

A1 10 km

(b)

M1 $\tan^{-1}\left(\frac{6}{8}\right) = 36.86\ldots°$

A1 $126.9°$



Answer: (a) 10 km; (b) $126.9°$

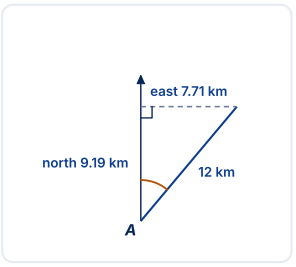
Question 3

3 marks

M1 $12\cos 40°$ or $12\sin 40°$

A1 9.19 km north

A1 7.71 km east



Answer: 9.19 km north, 7.71 km east

Question 4

2 marks

(a)

B1 37 km

(b)

B1 3.6 cm

Answer: (a) 37 km; (b) 3.6 cm

Question 5

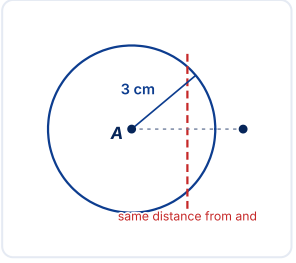
2 marks

(a)

B1 a circle, centre A, radius 3 cm

(b)

B1 the perpendicular bisector of AB



Answer: (a) circle, centre A, radius 3 cm; (b) perpendicular bisector of AB

Question 6

2 marks

M1 a quarter circle: $\frac{1}{4} \times \pi \times 4^2$

A1 $12.6\,\text{m}^2$

Answer: $12.6\,\text{m}^2$

Question 7

5 marks

(a)

B1 the bearing of A from B is $240°$, so angle $ABC = 240 - 150 = 90°$

(b)

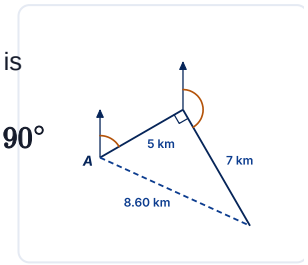
M1 $\sqrt{5^2 + 7^2}$

A1 8.60 km

(c)

M1 angle $BAC = \tan^{-1}\left(\frac{7}{5}\right) = 54.46\ldots°$

A1 $114.5°$



Answer: (a) shown; (b) 8.60 km; (c) $114.5°$

Question 8

3 marks

M1 midpoint $(3, 4)$

M1 gradient of AB is 1, so the locus has gradient -1

A1 $y = -x + 7$

Answer: $y = -x + 7$

Question 9

3 marks

M1 angle $PLS = \tan^{-1}\left(\frac{20}{15}\right) = 53.1\ldots°$

M1 $180 - 53.1\ldots$

A1 $126.9°$

Answer: $126.9°$

Question 10

2 marks

M1 C lies on the perpendicular bisector of AB: $\sqrt{5^2 - 4^2}$

A1 3 cm

Answer: 3 cm

Online, with every solution: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/bearings-and-constructions
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