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

Sine and Cosine Rules: exam questions

10 questions · 31 marks · mark schemes at the end

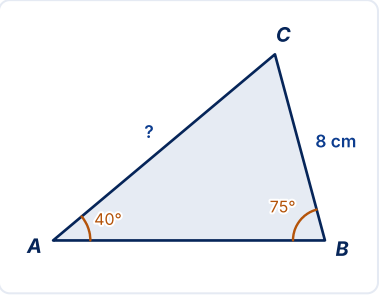
Name _____ Date _____ Score / 31

- 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/sine-and-cosine-rules

1. **3 marks**

In triangle ABC, angle $A = 40°$, angle $B = 75°$ and $BC = 8$ cm.

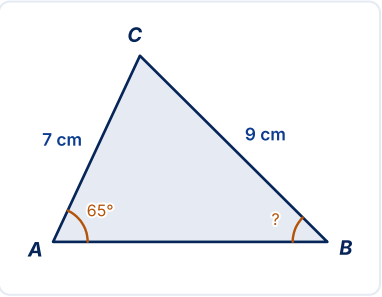
Work out the length of AC.



2. **3 marks**

In triangle ABC, $BC = 9$ cm, $AC = 7$ cm and angle $A = 65°$.

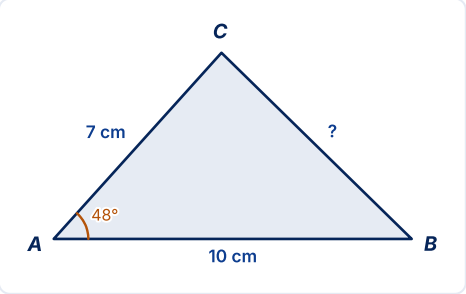
Work out the size of angle B.



3. **3 marks**

In triangle ABC, $AC = 7$ cm, $AB = 10$ cm and angle $BAC = 48°$.

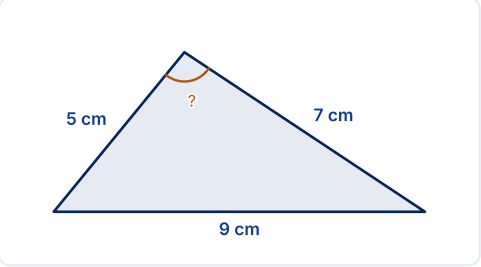
Work out the length of BC.



4. **3 marks**

A triangle has sides of 5 cm, 7 cm and 9 cm.

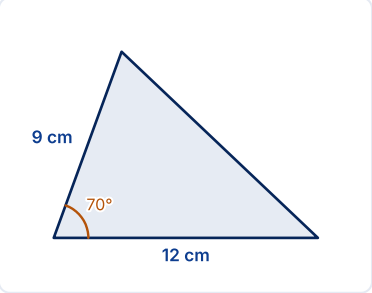
Work out the size of the largest angle.



5. **2 marks**

A triangle has sides of 9 cm and 12 cm with an angle of $70°$ between them.

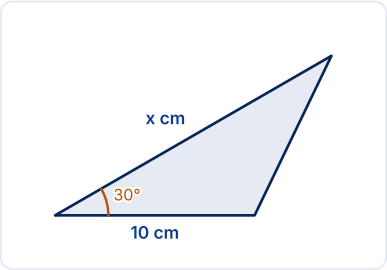
Work out the area of the triangle.



6. 3 marks

A triangle has sides of 10 cm and x cm with an angle of $30°$ between them. Its area is 40 cm².

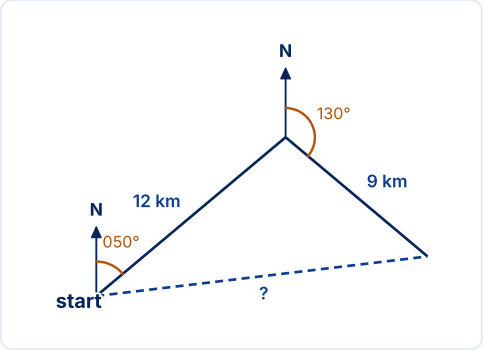
Work out the value of x.



7. 4 marks

A ship sails 12 km on a bearing of $050°$. It then sails 9 km on a bearing of $130°$.

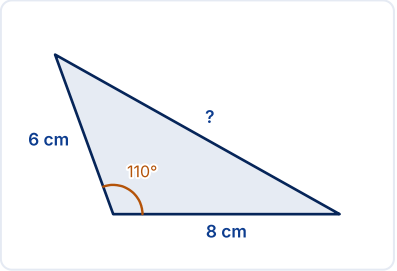
Work out the distance of the ship from its starting point.



8. 4 marks

A triangle has two sides of 6 cm and 8 cm with an angle of $110°$ between them.

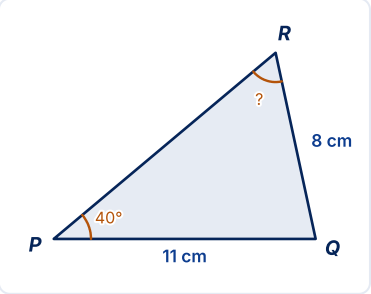
Work out the perimeter of the triangle.



9. 3 marks

In triangle PQR, $PQ = 11$ cm, $QR = 8$ cm and angle $QPR = 40°$. Angle PRQ is acute.

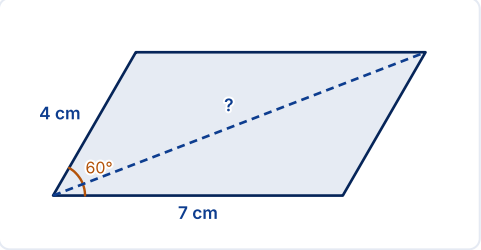
Work out the size of angle PRQ.



10. 3 marks

A parallelogram has sides of 7 cm and 4 cm, with an angle of $60°$ between them.

Work out the length of the longer diagonal.



Answers and worked solutions

Question 1 — 3 marks

M1 $\dfrac{AC}{\sin 75°} = \dfrac{8}{\sin 40°}$

M1 $AC = \dfrac{8 \sin 75°}{\sin 40°}$

A1 12.0 cm

Answer: 12.0 cm

Question 2 — 3 marks

M1 $\dfrac{\sin B}{7} = \dfrac{\sin 65°}{9}$

M1 $\sin B = 0.7049\ldots$

A1 $44.8°$

Answer: $44.8°$

Question 3 — 3 marks

M1 $BC^2 = 7^2 + 10^2 - 2 \times 7 \times 10 \cos 48°$

M1 $BC^2 = 55.3\ldots$

A1 7.44 cm

Answer: 7.44 cm

Question 4 — 3 marks

M1 $\cos C = \dfrac{5^2 + 7^2 - 9^2}{2 \times 5 \times 7}$

M1 $\cos C = -0.1$

A1 $95.7°$

Answer: $95.7°$

Question 5 — 2 marks

M1 $\frac{1}{2} \times 9 \times 12 \times \sin 70°$

A1 $50.7\,\text{cm}^2$

Answer: $50.7\,\text{cm}^2$

Question 6 — 3 marks

M1 $\frac{1}{2} \times 10 \times x \times \sin 30° = 40$

M1 $2.5x = 40$

A1 $x = 16$

Answer: $x = 16$

Question 7 — 4 marks

M1 angle at the turning point $180 - 80 = 100°$

M1 $d^2 = 12^2 + 9^2 - 2 \times 12 \times 9 \cos 100°$

M1 $d^2 = 262.5\ldots$

A1 16.2 km

Answer: 16.2 km

Question 8 — 4 marks

M1 $c^2 = 6^2 + 8^2 - 2 \times 6 \times 8 \cos 110°$

M1 $c^2 = 132.8\ldots$

A1 $c = 11.5\ldots$

A1 25.5 cm

Answer: 25.5 cm

Question 9 — 3 marks

M1 $\dfrac{\sin R}{11} = \dfrac{\sin 40°}{8}$

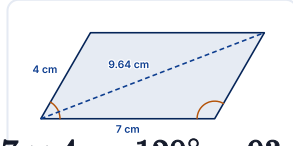
M1 $\sin R = 0.8838\ldots$

A1 $62.1°$

Answer: $62.1°$

Question 10 — 3 marks

M1 the angle opposite the longer diagonal is $120°$



M1 $d^2 = 7^2 + 4^2 - 2 \times 7 \times 4 \cos 120° = 93$

A1 9.64 cm

Answer: 9.64 cm

Online, with every solution: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/sine-and-cosine-rules
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