Congruent Triangles: exam questions

10 questions · 25 marks · mark schemes at the end

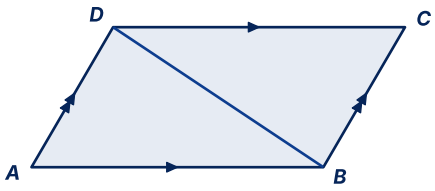
Name _____ Date _____ Score / 25

- 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/congruent-triangles

1. **3 marks**

$ABCD$ is a parallelogram.

Prove that triangle ABD is congruent to triangle CDB.



2. **1 mark**

In triangles ABC and PQR, $AB = PQ = 5$ cm, $BC = QR = 7$ cm and angle ABC = angle $PQR = 40°$.

Write down the condition that shows the triangles are congruent.

3. **2 marks**

In triangle ABC, angle $A = 50°$, angle $B = 60°$ and $AC = 8$ cm.

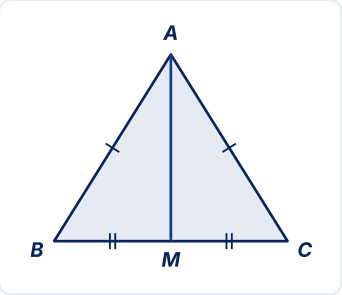
In triangle DEF, angle $D = 50°$, angle $E = 60°$ and $DF = 8$ cm.

Are the triangles congruent? Give a reason.

4. **3 marks**

Triangle ABC is isosceles with $AB = AC$. M is the midpoint of BC.

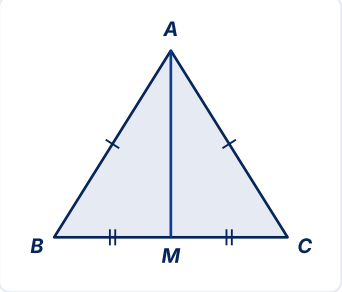
Prove that triangles ABM and ACM are congruent.



5. **2 marks**

Triangle ABC is isosceles with $AB = AC$. M is the midpoint of BC, and triangles ABM and ACM are congruent.

Show that AM is perpendicular to BC.



6. **2 marks**

Two right-angled triangles each have a hypotenuse of 13 cm and one other side of 5 cm.

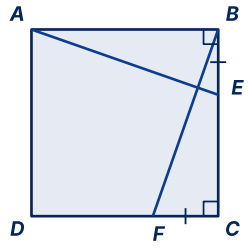
(a) Explain why the triangles are congruent. **(1)**

(b) Work out the length of the third side. **(1)**

7. **3 marks**

$ABCD$ is a square. E is a point on BC and F is a point on CD so that $BE = CF$.

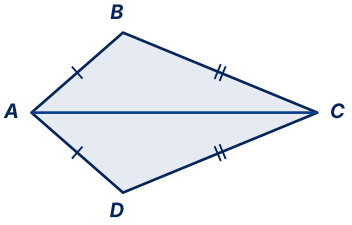
Prove that triangle ABE is congruent to triangle BCF.



8. **3 marks**

$ABCD$ is a kite with $AB = AD$ and $CB = CD$.

Prove that triangle ABC is congruent to triangle ADC.



9. **3 marks**

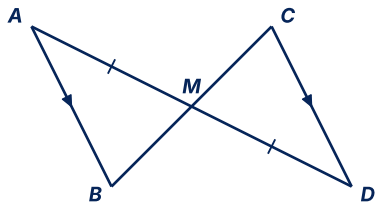
Triangles PQR and XYZ are congruent, with P, Q, R matching X, Y, Z. $PQ = 6$ cm, $QR = 9$ cm and angle $PQR = 70°$.

Work out the length of XZ. Give your answer correct to 3 significant figures.

10. **3 marks**

The straight lines AD and BC cross at M. $AM = MD$ and AB is parallel to CD.

Prove that triangles ABM and DCM are congruent.



Answers and worked solutions

Question 1 — 3 marks

B1 $AB = CD$ and $AD = CB$ (opposite sides of a parallelogram are equal)

B1 BD is common to both triangles

B1 so the triangles are congruent (SSS)

Answer: proof (SSS)

Question 2 — 1 mark

B1 SAS

Answer: SAS

Question 3 — 2 marks

M1 angle C = angle $F = 70°$

A1 Yes: $AC = DF$ with the angles at each end equal (ASA)

Answer: Yes (ASA)

Question 4 — 3 marks

B1 $AB = AC$ (given)

B1 $BM = CM$ (M is the midpoint) and AM is common

B1 congruent (SSS)

Answer: proof (SSS)

Question 5 — 2 marks

M1 angle AMB = angle AMC (corresponding angles of congruent triangles)

A1 they add to $180°$ (straight line), so each is $90°$

Answer: shown

Question 6 — 2 marks

(a)

B1 RHS: right angle, equal hypotenuses and one other side equal

(b)

B1 12 cm

Answer: (a) RHS; (b) 12 cm

Question 7 — 3 marks

B1 $AB = BC$ (sides of a square)

B1 angle ABE = angle $BCF = 90°$, and $BE = CF$ (given)

B1 congruent (SAS)

Answer: proof (SAS)

Question 8 — 3 marks

B1 $AB = AD$ and $CB = CD$ (given)

B1 AC is common

B1 congruent (SSS)

Answer: proof (SSS)

Question 9 — 3 marks

M1 $XZ = PR$

M1 $PR^2 = 6^2 + 9^2 - 2 \times 6 \times 9 \cos 70°$

A1 8.95 cm

Answer: 8.95 cm

Question 10 — 3 marks

B1 angle AMB = angle DMC (vertically opposite angles)

B1 angle BAM = angle CDM (alternate angles), and $AM = MD$

B1 congruent (ASA)

Answer: proof (ASA)

Online, with every solution: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/congruent-triangles
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