

Congruent Triangles and Geometric Proof

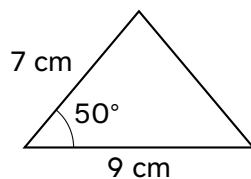
For Pearson Edexcel GCSE Mathematics (1MA1) • Higher tier

Name _____

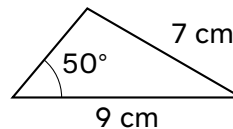
Total marks: **29**

Answer **all** questions in the spaces provided. Show your working: marks are given for correct method. Diagrams are NOT accurately drawn.

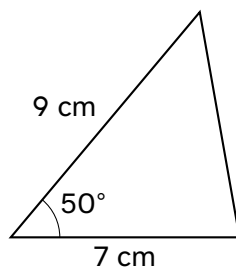
1 Here are four triangles, X , P , Q and R .



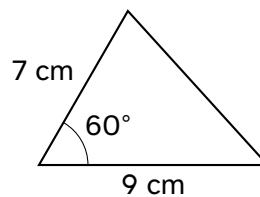
Triangle X



Triangle P



Triangle Q



Triangle R

Diagram **NOT** accurately drawn

One of the triangles P , Q and R is congruent to triangle X .
Which one?

Give a reason for your answer.

(2)

(Total for Question 1 is 2 marks)

2 Here is triangle ABC .

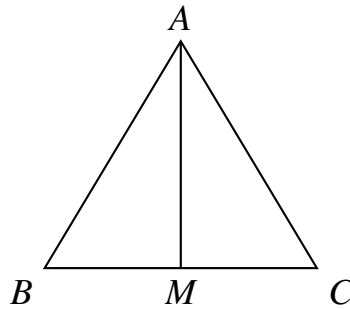


Diagram **NOT** accurately drawn

ABC is an isosceles triangle with $AB = AC$.

M is the midpoint of BC .

Prove that triangle ABM is congruent to triangle ACM .

(3)

(Total for Question 2 is 3 marks)

3 Prove that the exterior angle of a triangle is equal to the sum of the two opposite interior angles.

(3)

(Total for Question 3 is 3 marks)

- 4 $ABCD$ is a square. E is a point on BC and F is a point on DC such that $BE = CF$.

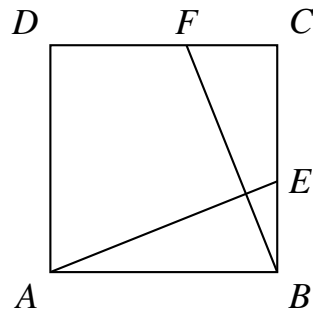


Diagram **NOT** accurately drawn

Prove that triangle ABE is congruent to triangle BCF .

(3)

(Total for Question 4 is 3 marks)

- 5 $ABCD$ is a parallelogram. X is the midpoint of the diagonal AC . The straight line PXQ meets AB at P and DC at Q .

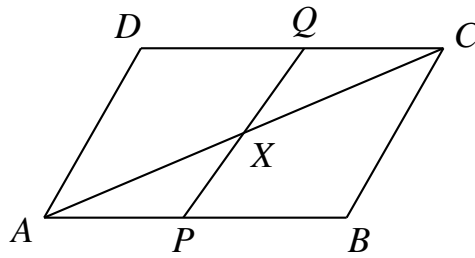


Diagram **NOT** accurately drawn

Prove that X is the midpoint of PQ .

(4)

(Total for Question 5 is 4 marks)

6 Here is a trapezium.

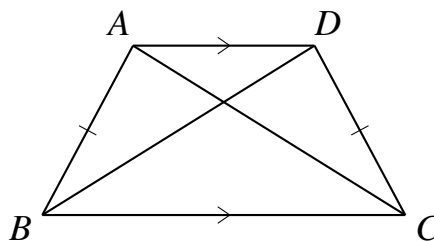


Diagram **NOT** accurately drawn

$ABCD$ is a trapezium with AD parallel to BC .

$AB = DC$ and angle $ABC = \text{angle } DCB$.

Prove that $AC = BD$.

(3)

(Total for Question 6 is 3 marks)

7 Here is a circle, centre O .

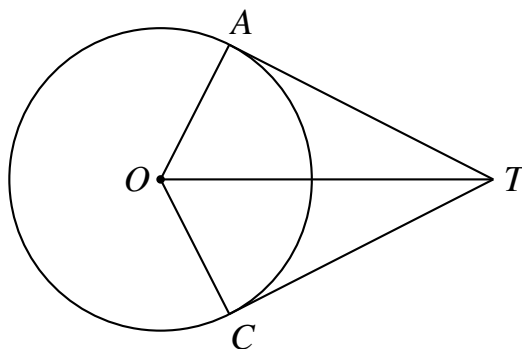


Diagram **NOT** accurately drawn

A and C are points on a circle, centre O .
 TA and TC are tangents to the circle.
Prove that $TA = TC$.

(3)

(Total for Question 7 is 3 marks)

- 8 The diagram shows a triangle ABC . D is a point on AB and E is a point on AC .

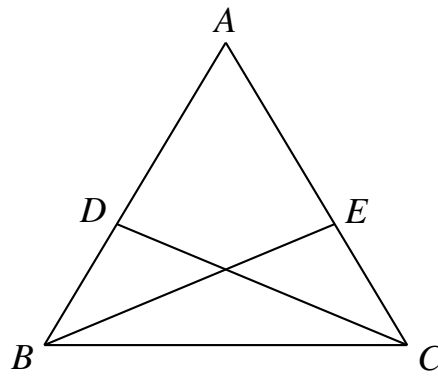


Diagram **NOT** accurately drawn

$$AB = AC$$

$$BD = CE$$

Prove that triangle DBC is congruent to triangle ECB .

(3)

(Total for Question 8 is 3 marks)

- 9 $ABCD$ is a rectangle.
 M is the midpoint of AB .

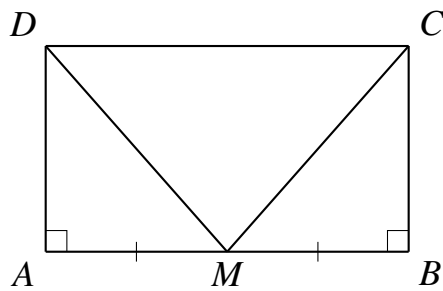


Diagram **NOT** accurately drawn

- (a) Prove that triangle AMD is congruent to triangle BMC .

(3)

- (b) Hence show that angle MDC = angle MCD .

(2)

(Total for Question 9 is 5 marks)