Surname	
Other Names	
Candidate's Signature	

GCSE 9 - 1 Questions

Congruent Triangles 2

Calculator Allowed

INSTRUCTIONS TO CANDIDATES

- Write your name in the space provided.
- Write your answers in the spaces provided in this question paper.
- Answer ALL questions.
- Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
- You should have a ruler, compass and protractor where required.

Total Marks :

1) In the diagram below, the lengths shown are in cm.
Which **TWO** of the following triangles are congruent?

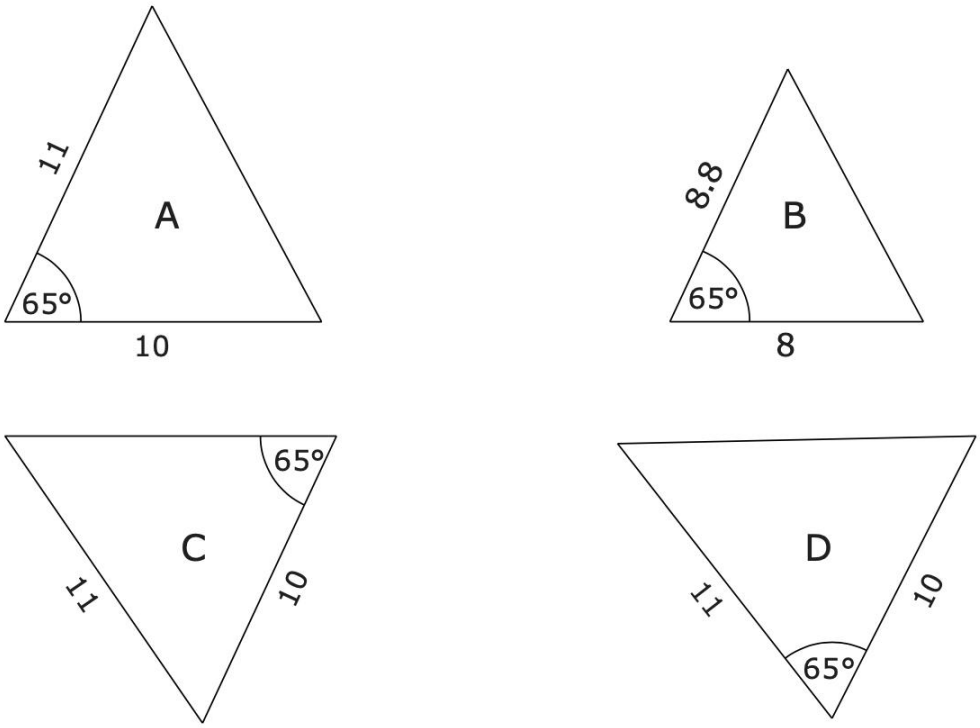


Diagram not drawn to scale

Ans _____ [2]

2) John thinks about transformations of triangles.

He draws a triangle and then he reflects it.

He then translates the original.

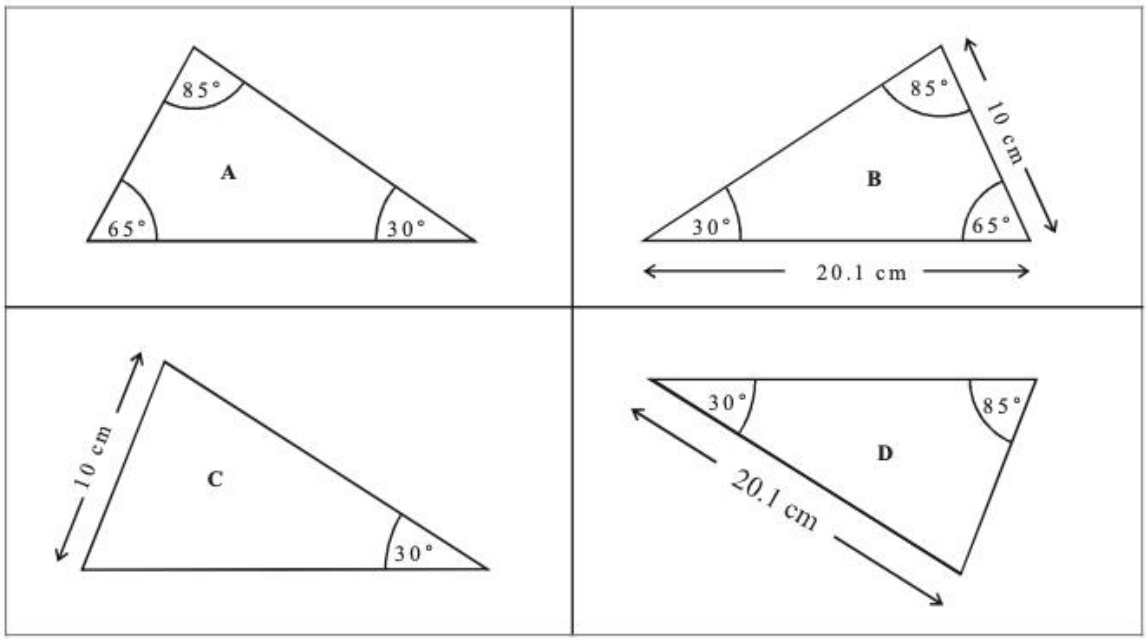
He enlarges the original, and finally he rotates the original.

He notices that all the shapes are congruent except one.

Which transformation caused the shape not to be congruent?

Answer.....[1]

3)



The four triangles A, B, C and D above are **NOT** drawn to scale.
Without drawing them precisely, say which two of them are congruent. Explain your reasoning.

[3]

4) ABCD is a parallelogram. DM and BN are both perpendicular to the diagonal AC.

a) Show that triangle ADM is congruent to triangle CBN.

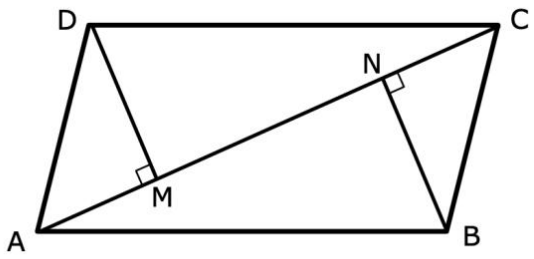
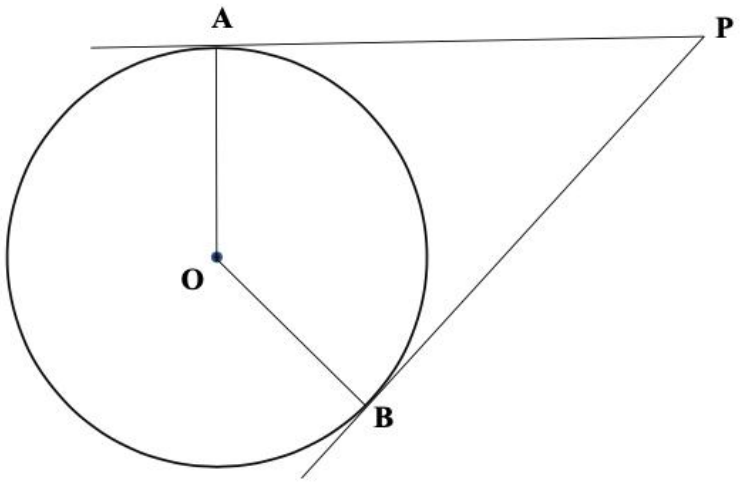


Diagram NOT drawn to scale

b) AC = 20 cm and AM = x cm. Write an expression for the length of MN.

[5]

5) AP and BP are two tangents to a circle with centre O.



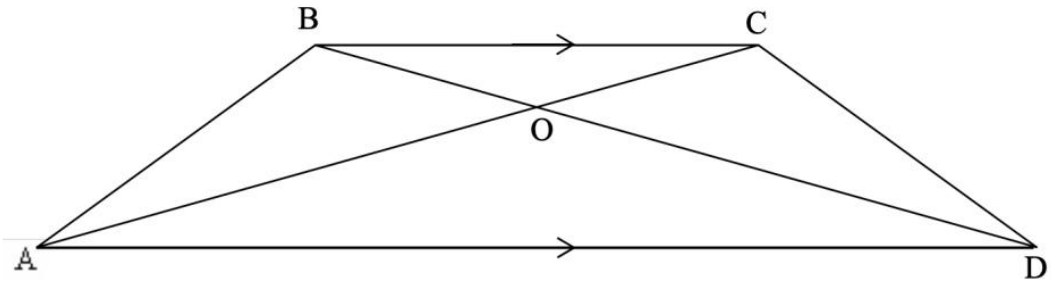
(a) Write down the size of angle OAP.

Ans: _____

(b) Prove that triangles AOP and BOP are congruent.

(5 marks)

6) **ABCD** is an isosceles trapezium. In the figure shown, **OB** = **OC** and **BC** is parallel to **AD**.



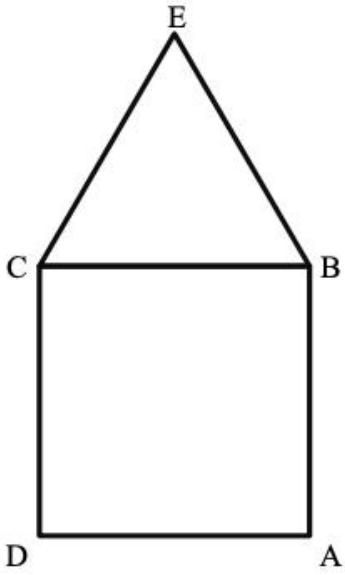
(a) Explain why in triangle AOD, AO = OD.

(b) Prove that triangles AOB and DOC are **congruent**.

(7 marks)

7) ABCD is a **square** and CBE is an **equilateral triangle**.

(a) Explain why $\angle ABE = 150°$.



_____

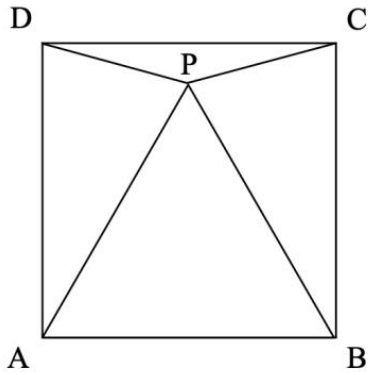
_____

(b) Prove that the triangles DCE and ABE are **congruent**.

(6 marks)

8) ABCD is a **square** and ABP is an **equilateral triangle**.

(a) Prove that triangles ADP and BCP are **congruent**.



(b) Write down the size of ∠DPC.

(5 marks)

9) (i) Two triangles are congruent. Which statement is true

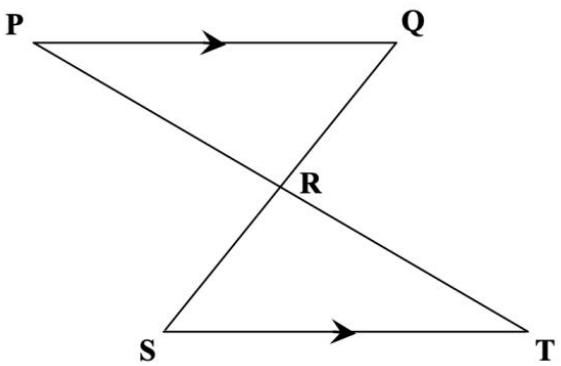
A. The areas of the two triangles are **always** equal.

B. The areas of the two triangles are **sometimes** equal.

C. The areas of the two triangles are **never** equal.

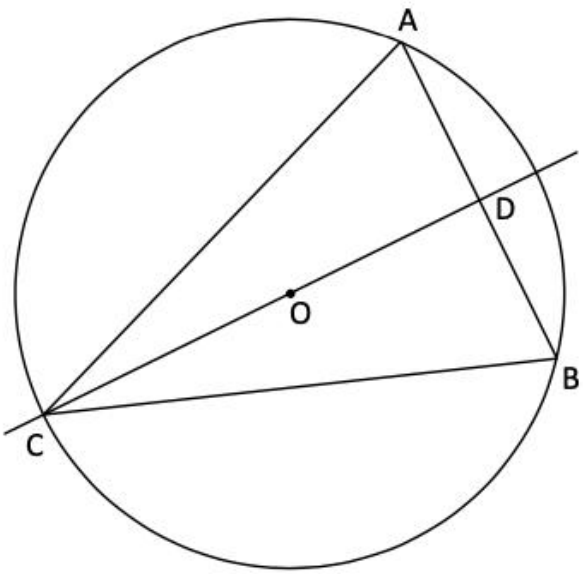
Answer.....[1]

(ii) In the diagram the straight lines PRT and QRS intersect at R. PQ is **parallel** and **equal** to ST. Prove that triangles PQR and TSR are congruent.



[4]

10) A, B and C lie on the circumference of a circle centre O. D is the mid-point of AB and CD passes through O.



(a) What is the size of $A\hat{D}C$? Give a reason for your answer.

Ans:_____

Reason: _____

(b) Show that triangles ADC and BDC are congruent.

(6 marks)

11) ABCD is a square. Line BE bisects angle $F\hat{B}C$. EF is perpendicular to the diagonal BD.

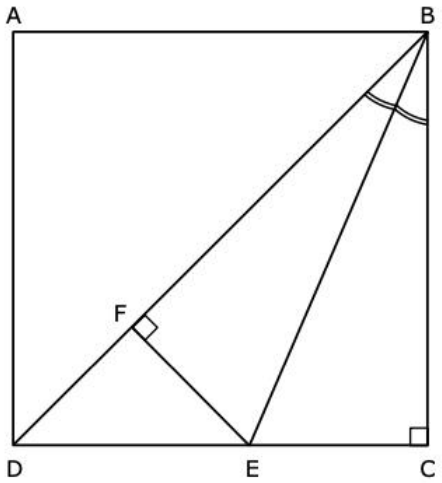


Diagram not drawn to scale

(a) State the size of the following angles:

(i) $B\hat{D}C$ (1)

(i) $D\hat{E}F$ (1)

(b) Work out the size of angle $E\hat{B}C$.

(2)

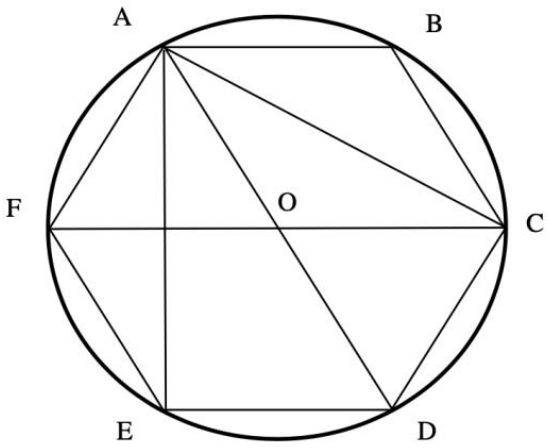
(c) Prove that triangles BFE and BCE are congruent.

(3)

(d) Name a triangle that is similar but not congruent to triangle DFE.

(1)

12) ABCDEF is a regular hexagon, whose vertices lie on the circumference of a circle with centre O. Show, explaining your reasoning, that triangles AED and CAF are congruent.



(7 marks)

13) In the given diagram AB = CB and PA = PC.

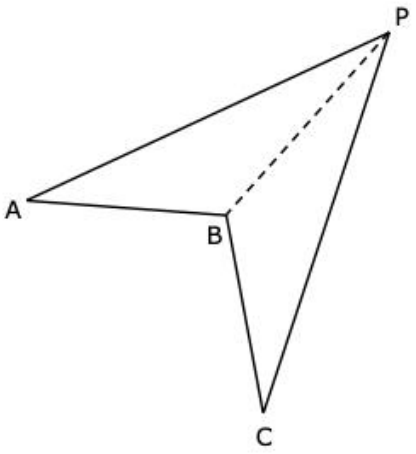


Diagram not drawn to scale

(a) Show that triangles PAB and PCB are congruent.

(3)

(b) Given that ∠APC = 58° and ∠PAB = 36°, find the value of ∠PBC.

(3)

14)

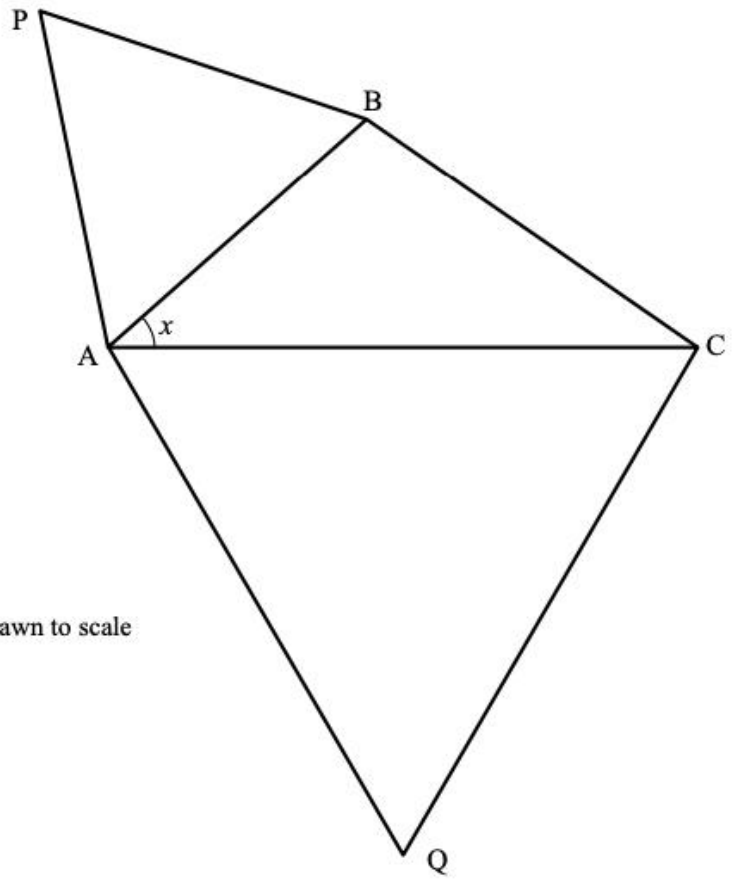


Diagram NOT drawn to scale

ABC is a triangle where $\angle BAC = x$. Triangles PAB and QAC are equilateral.

a) Write down the value of $\angle PAB$.

Ans: _____ °

b) i) Join the points P and C with a straight line. Similarly, join Q and B. Show that triangles PAC and QAB are **congruent**.

ii) Which angle is equal to $\angle AQB$? Explain why.

_____

_____

(7 marks)

15) In the figure below, the three angles at A are all equal.
AR and AT are both 20 cm long.
AS is 10 cm long.

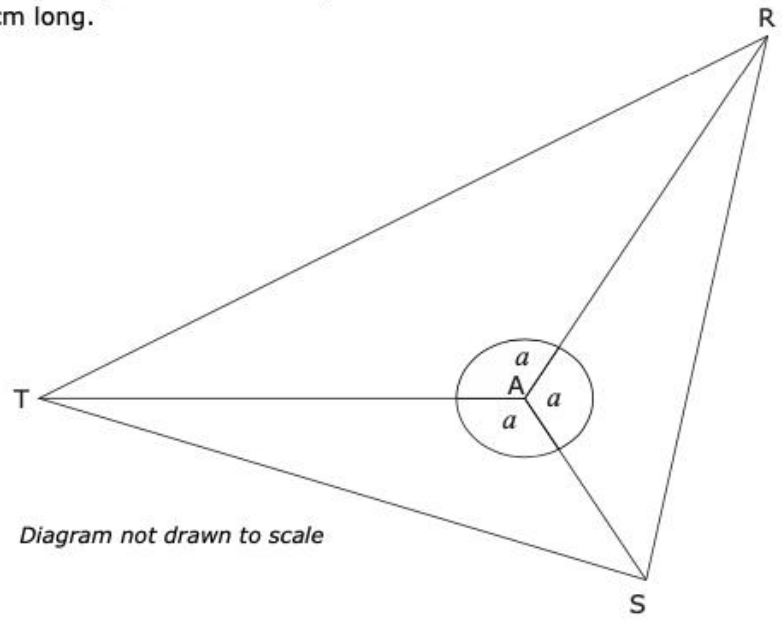


Diagram not drawn to scale

(a) Work out the size of ∠RAT.

(1)

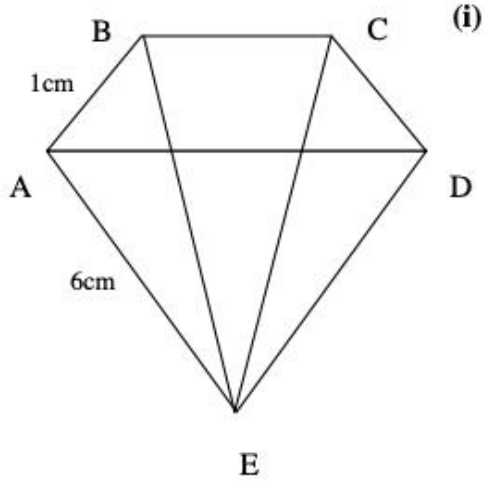
(b) Explain why triangle ARS is congruent to triangle ATS.

(3)

(c) Name **TWO** triangles in the figure which are isosceles.

(2)

16) A diamond company logo is drawn below. ADE is an equilateral triangle of side 6cm. Sides AB and CD are both 1cm in length and angles BAE and CDE are right angles.



The diagram is not drawn to scale

(i) Show that triangles BAE and CDE are congruent

4 marks

(ii) Find angle CBE, giving reasons. Give your answer to the nearest degree.

5 marks

17) The diagonals of a parallelogram ABCD intersect at M.
X is a point on AB such that MX is the altitude of triangle AMB.
Y is a point on AD such that MY is the altitude of triangle AMD.
M is equidistant from AB and AD.

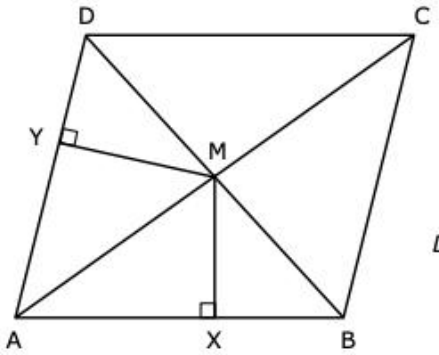


Diagram not drawn to scale

(a) Prove that triangles YDM and XBM are congruent.

(3)

(b) Prove that triangles AYM and AXM are congruent.

(3)

(c) Deduce that ABCD is a rhombus.

(3)