



Congruent triangles

About 50 minutes No calculator 40 marks

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

A1 Needed today [2 marks] **A2** From chapter 2 [2 marks]

In triangle ABC , $AB = AC$.
Angle $BAC = (2x - 6)^\circ$ and
angle $ABC = (2x + 9)^\circ$. Find x .

Omar has £30. Omar spends $\frac{1}{3}$
of it on a coat and $\frac{1}{5}$ of what is
left on shoes. How much money
is left?

Answer

Answer

A3 From chapter 5 [2 marks] **A4** Last lesson [2 marks]

300 g of liquid A, density 2 g/cm³,
is mixed with 40 g of liquid B,
density 0.8 g/cm³. Work out the
density of the mixture.

The bearing of B from A is 107° .
The bearing of C from B is 229° .
Work out the size of angle ABC .

Answer

Answer

B Example, then your turn

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

In triangles ABC and PQR , $AB = PQ = 7$
cm, $AC = PR = 11$ cm and angle $A =$ angle
 $P = 48^\circ$. Name the condition that proves
them congruent. BC measures 8.2 cm and
angle B measures 93° . Write down QR and
angle Q .

Hint Is the equal angle between the two equal sides?
Then match the letters in order: $A \rightarrow P$, $B \rightarrow Q$,
 $C \rightarrow R$.

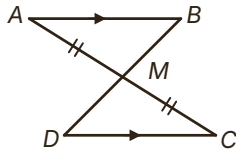
B1 In triangles DEF and XYZ , [3 marks]

$DE = XY = 9$ cm,
 $DF = XZ = 14$ cm and angle
 $D =$ angle $X = 63^\circ$. Name the
condition that proves them
congruent. EF measures 12.8
cm and angle E measures 78° .
Write down YZ and angle Y .

Answer ; $YZ =$ cm; $Y =$ °

EXAMPLE 2

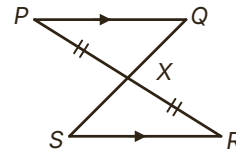
AB is parallel to DC . AC and BD meet at M , and $AM = MC$. Prove that triangle ABM is congruent to triangle CDM .



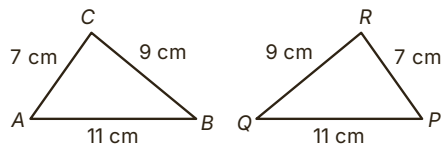
Hint Find two pairs of equal angles and one pair of equal sides, and give a reason for each.

B2 PQ is parallel to SR . PR and QS meet at X , and $QX = XS$. [3 marks]

Prove that triangle PQX is congruent to triangle RSX .

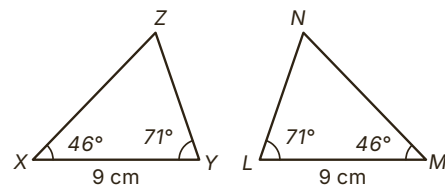
**c Practice**

- C1** Name the condition that proves these triangles congruent. [2 marks]
Which side of triangle PQR is equal to BC ?



Answer and

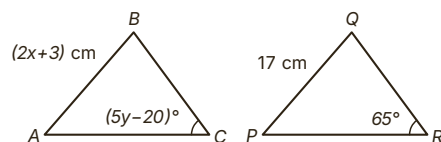
- C2** Are triangles XYZ and LMN congruent? Give a reason. [3 marks]
Which side of LMN is equal to XZ ? Work out angle N .



Not drawn accurately

Answer ; ; ; $N = \dots\dots^\circ$

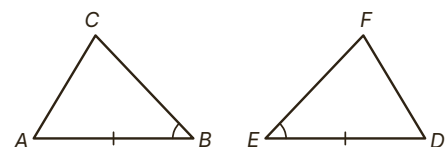
- C3** Triangle ABC is congruent to triangle PQR , with the letters in order. Find x and y . [3 marks]



Not drawn accurately

Answer $x = \dots\dots$ $y = \dots\dots$

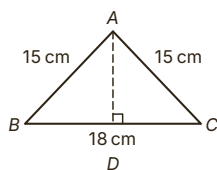
- C4** $AB = DE$ and angle $B =$ angle E . Write down one more fact that would prove the triangles congruent by SAS, and another that would prove it by ASA. [2 marks]



Answer SAS: ASA:

D Exam-style questions

D1 Triangle ABC has $AB = AC = 15$ cm and $BC = 18$ cm. AD is perpendicular to BC .



Not drawn accurately

(a) Prove that triangle ABD is congruent to triangle ACD . [2 marks]

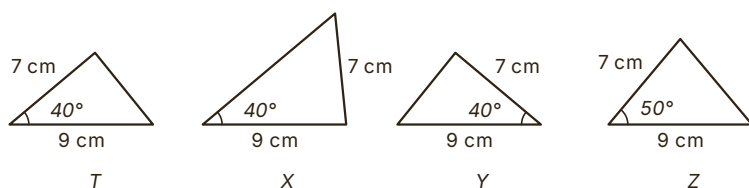
(b) Hence work out the area of triangle ABC . You must show your working. [4 marks]

Answer

Total for D1: 6 marks

D2 Here are four triangles, T , X , Y and Z . Ali says, " X , Y and Z are all congruent to T , because each of them has a 9 cm side and a 7 cm side."

Ali is wrong.



(a) Which of X , Y and Z must be congruent to triangle T ? Give the condition. [2 marks]

Answer Triangle by

(b) Explain why triangle X need not be congruent to triangle T . [2 marks]

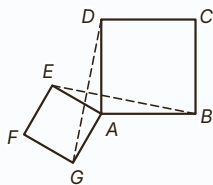
(c) Lena says, "A triangle with the same three angles as triangle T must be congruent to triangle T ." Explain why Lena is wrong. [2 marks]

Total for D2: 6 marks

E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** $ABCD$ and $AEFG$ are squares, both lettered anticlockwise, with the corner A in common. Prove that $BE = DG$. [4 marks]



Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Look for one triangle holding BE and one holding DG . Both have a corner at A .
- Hint 2** Compare triangle ABE with triangle ADG . Which sides are sides of the squares?
- Hint 3** $AB = AD$ and $AE = AG$. Angle $BAE = 90^\circ + \text{angle } DAE = \text{angle } DAG$. SAS gives $BE = DG$.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

I can say which of SSS, SAS, ASA and RHS proves two triangles congruent, and match their letters.



I can write a congruence proof with a reason for every step.



I can explain why three angles, or two sides and an angle outside them, prove nothing.

