



Congruent triangles

Year 7 About 60 minutes No calculator 46 marks

Date _____

A Do Now

Quick questions to start.

- A1** Needed today [1 mark] Two angles of a triangle are 54° and 77° . Work out the third angle.
- A2** Needed today [1 mark] What is the name of the longest side of a right-angled triangle?

Answer

Answer

- A3** Last lesson [1 mark] Are a 3 cm by 8 cm rectangle and a 4 cm by 6 cm rectangle congruent? Answer yes or no.
- A4** From chapter 4 [1 mark] Increase £60 by 15%.

Answer

Answer

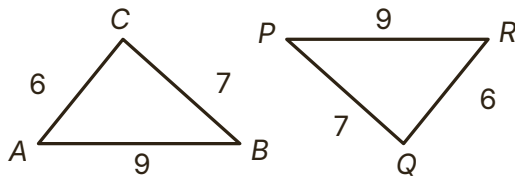
B Example, then your turn

Year 7

Your teacher works through each example with you. Then try the one beside it. All lengths are in cm.

EXAMPLE 1

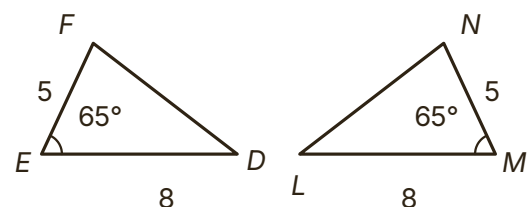
Are triangles ABC and PQR congruent?
Give the condition.



Not drawn accurately

Hint The four conditions: SSS (three sides), SAS (two sides and the angle between them), ASA (two angles and a side), RHS (right angle, hypotenuse, side).

- B1** Show that triangles DEF and LMN are congruent. Give the condition. Which side of LMN is equal to DF ? [3 marks]

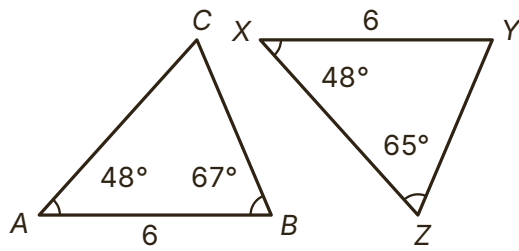


Not drawn accurately

Answer

EXAMPLE 2

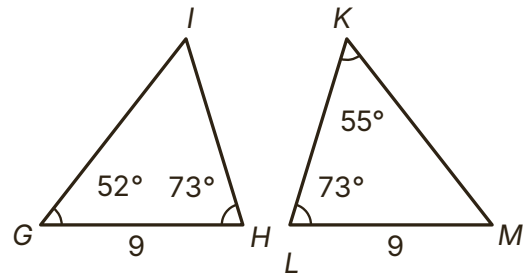
Show that triangles ABC and XYZ are congruent.



Not drawn accurately

Hint Work out the missing angles first, using the angle sum of a triangle.

B2 Show that triangles GHI and KLM are congruent. Give the condition. [3 marks]

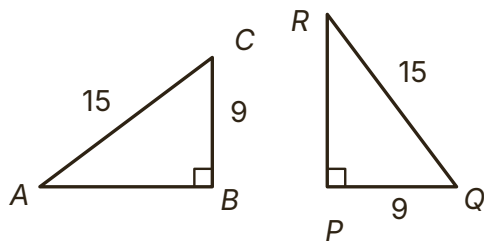


Not drawn accurately

Answer

EXAMPLE 3

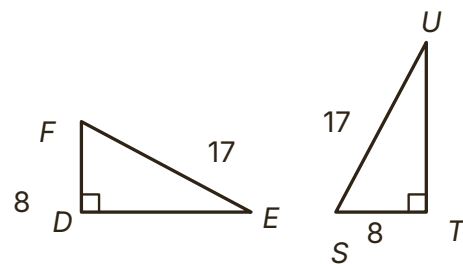
Are triangles ABC and PQR congruent? Give the condition.



Not drawn accurately

Hint Both have a right angle. Look for the hypotenuse.

B3 Are triangles DEF and STU congruent? Give the condition. Which angle of STU is equal to angle E ? [3 marks]



Not drawn accurately

Answer

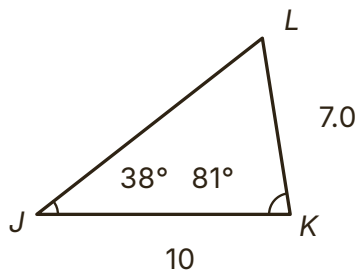
- C1** Two triangles both have angles 40° , 65° and 75° . Must they be congruent? Give a reason. [2 marks]

Answer

- C2** Sam draws a triangle with sides 8 cm and 7 cm, and an angle of 50° opposite the 7 cm side. He says, "Everyone who draws this will get the same triangle." Is he right? Give a reason. [2 marks]

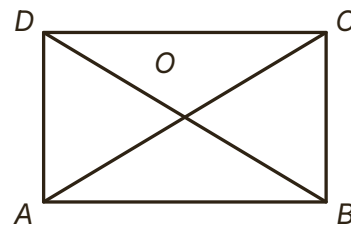
Answer

- C3** Triangle TUV has $TU = 10$ cm, angle $U = 81^\circ$ and angle $V = 61^\circ$. Work out angle T . Show that triangles JKL and TUV are congruent. Write down the length of UV . [3 marks]



Not drawn accurately

- C4** $ABCD$ is a rectangle. Its diagonals cross at O . How many other triangles in the diagram are congruent to triangle ABC ? [2 marks]



Answer

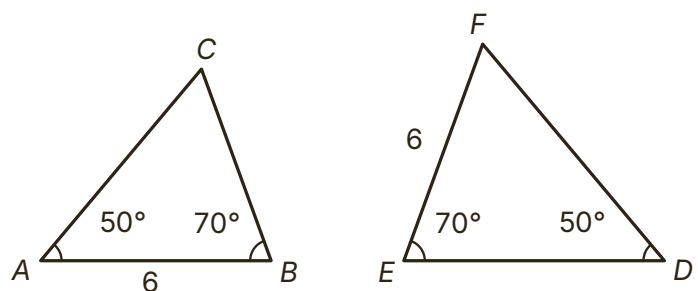
Answer

D Exam-style questions

GCSE Foundation

- D1** Amy says, "Triangles ABC and DEF both have angles of 50° and 70° and a side of 6 cm. So they are congruent." [3 marks]

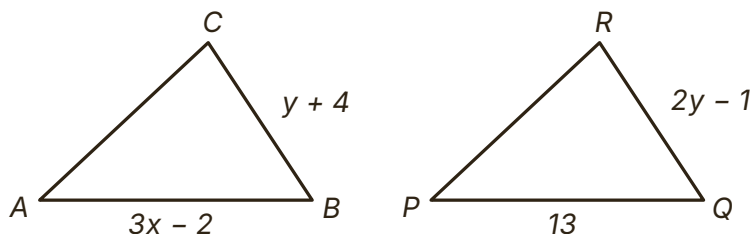
Is Amy correct? Give a reason for your answer.



Not drawn accurately

D2 Triangles ABC and PQR are congruent. A matches P , B matches Q and C matches R .

- (a) Work out the value [2 marks]
of x .



Answer

- (b) Work out the [2 marks]
length of BC .

Not drawn accurately

Answer

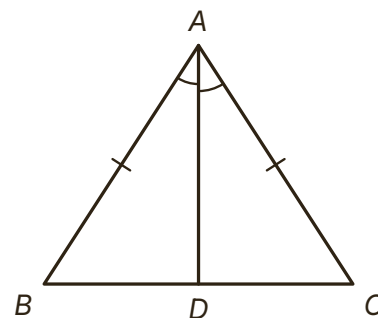
- (c) $CA = 11$ cm. Work out the perimeter of triangle PQR . [2 marks]

Answer

Total for D2: 6 marks

D3 ABC is an isosceles triangle with $AB = AC$. The line AD cuts angle BAC in half. D is on BC .

- (a) Show that triangles ABD and ACD are [3 marks]
congruent.



- (b) $BC = 13.6$ cm. Work out the length of BD . [1 mark]

Answer

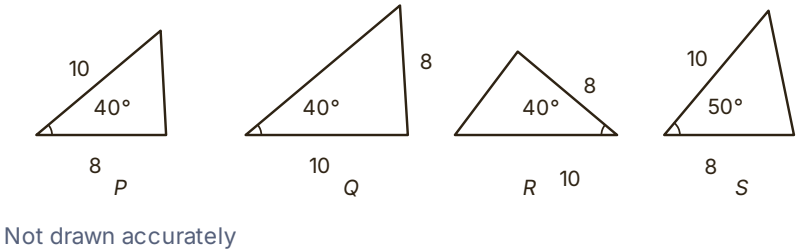
- (c) Explain why angle $ADB = 90^\circ$. [2 marks]

Total for D3: 6 marks

D4

Here are four triangles. Which two triangles are congruent? Give the condition.
Give a reason why each of the other two is not congruent to them.

[4 marks]



E

Extension

Stretch

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

E1

$ABCDEF$ is a regular hexagon. Triangle ABD is shaded. How many triangles with their three corners at corners of the hexagon are congruent to triangle ABD ? Count triangle ABD itself.

[5 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

E1

Hint 1

AD goes through the centre of the hexagon. Every triangle congruent to ABD has one side that goes through the centre.

Hint 2

There are 3 lines through the centre, AD , BE and CF . How many triangles like ABD use the line AD ?

Hint 3

AD makes 4 triangles: ABD , ACD , ADE and ADF . The same happens for BE and CF . That is 3×4 .

How did it go?

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

I can use SSS, SAS, ASA and RHS to show that two triangles are congruent.

I can use congruent triangles to find a missing side or angle.

I know why three equal angles are not enough.

I can find congruent triangles in a shape.