Construction and congruence

- Constructing the circumcircle of a triangle
- Constructing the inscribed circle of a triangle
- Recognising the conditions for congruence
- Proving that two triangles are congruent

Keywords

You should know

explanation 1a | explanation 1b | explanation 1c | explanation 1d | online

1 This question is about constructing a perpendicular bisector of a line.

a Draw a line AB that is 12 cm long.

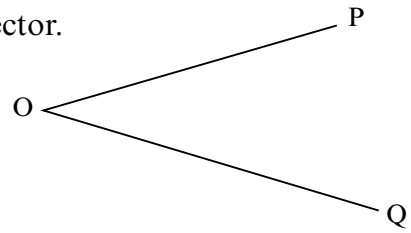
b Construct the perpendicular bisector of AB.

2 This question is about constructing an angle bisector.

a Draw two lines OP and OQ that meet at O.

b Construct the angle bisector of angle POQ.

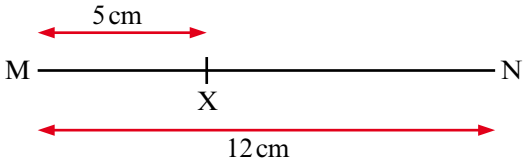
c Use a protractor to check your accuracy.



3 This question is about constructing a perpendicular to a line.

a Draw the diagram accurately.

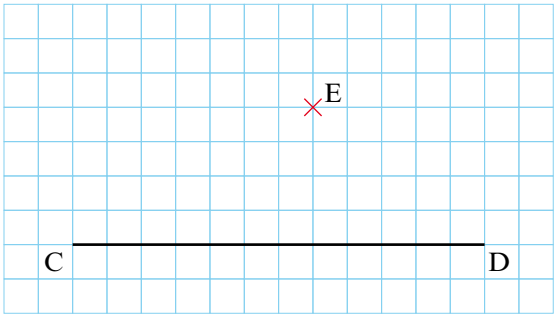
b Construct the perpendicular to line MN at X.



4 This question is about constructing a perpendicular to a line.

a Copy the diagram accurately onto 1 cm^2 paper.

b Construct a perpendicular from E to the line CD.

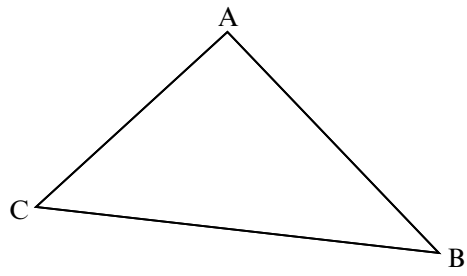


5 This question is about constructing perpendicular bisectors.

a Draw a triangle ABC.

b Construct the perpendicular bisector of each of the sides of triangle ABC.

c Find the point where your three perpendicular bisectors meet. Label this point X.



d Using X as the centre and AX as the radius, draw a circle. If your constructions are accurate your circle should pass through the points A, B and C. This circle is called the circumcircle.

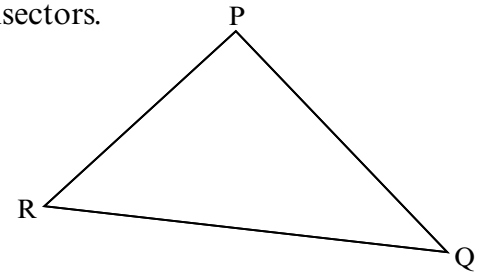
e Draw a different triangle. Repeat steps **b**, **c** and **d** to draw the circumcircle for your new triangle.

6 This question is about constructing angle bisectors.

a Draw a triangle PQR.

b Construct the angle bisector of each of the angles of triangle PQR.

c Find the point where your three angle bisectors meet. Label this point Y.



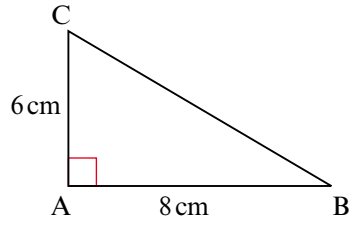
d Construct the perpendicular from Y to the line PQ. Label the point where they meet Z.

e Using Y as the centre and YZ as the radius, draw a circle. If your constructions are accurate your circle should touch each of the three sides of the triangle. This circle is called the inscribed circle.

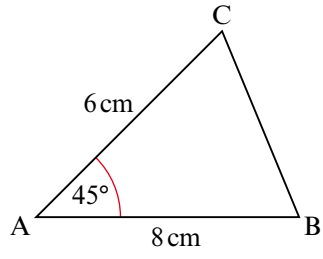
f Repeat steps **a** to **e** to draw the inscribed circle for a differnt triangle.

7 On plain paper, construct each shape. Use a ruler and compasses only. Measure the length BC in each case. (Hint: to construct an angle of 45°, construct a perpendicular, and then bisect the 90° angle.)

a



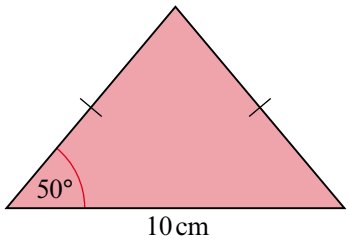
b

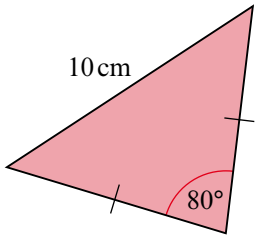


explanation 2a | explanation 2b

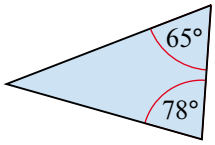
8 Look at each pair of triangles. State whether the triangles in each pair are definitely congruent or not. Give explanations for your answers.

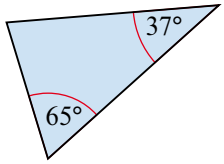
a



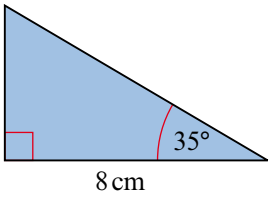


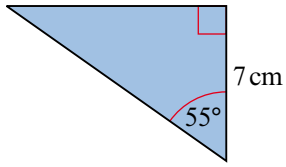
b



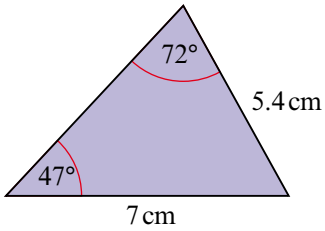


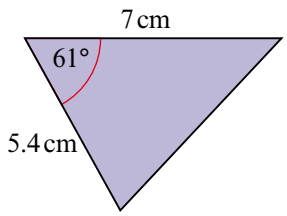
c



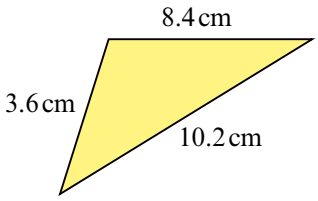


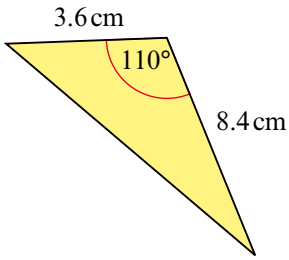
d





e

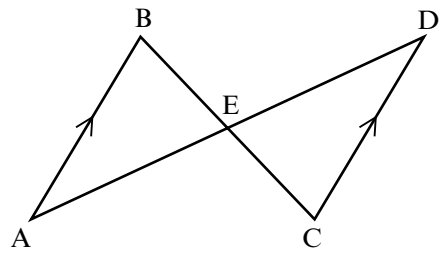




explanation 3

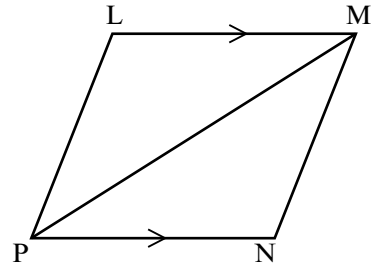
9 The straight lines AB and CD are equal in length and parallel.

Prove that triangles AEB and DEC are congruent.



10 The straight lines LM and PN are equal in length and parallel.

Prove that triangles PLM and PNM are congruent.

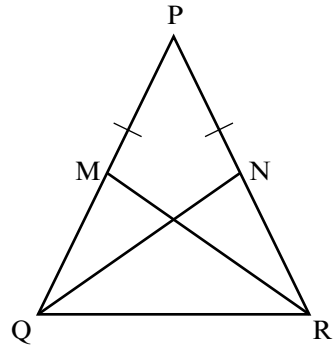


11 PQR is an isosceles triangle with PQ = PR.

M is the midpoint of PQ.

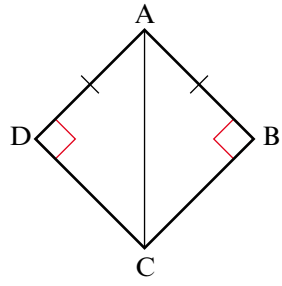
N is the midpoint of PR.

Prove that triangle PQN is congruent to triangle PRM.



12 ABCD is a quadrilateral with AD = AB.

Angle ADC = angle ABC = 90°.
Prove that triangles ADC and ABC are congruent.



13 LMNP is an trapezium.
LP = MN and angle PLM = angle NML.
Prove that triangle PLM is congruent to triangle NML.