6. Practical geometry

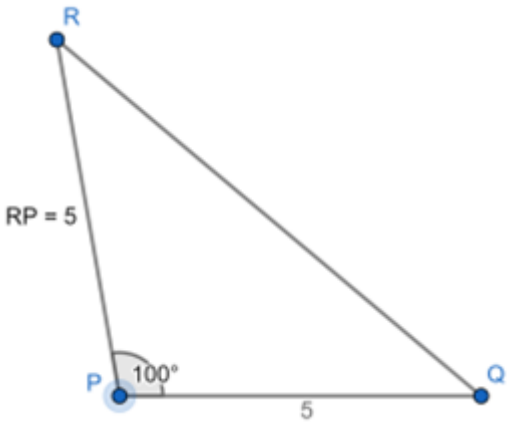
Exercise 6.1

1. Question

Construct ΔPQR with PQ = 5cm, ∠P = 100° and PR = 5cm and draw its circumcircle.

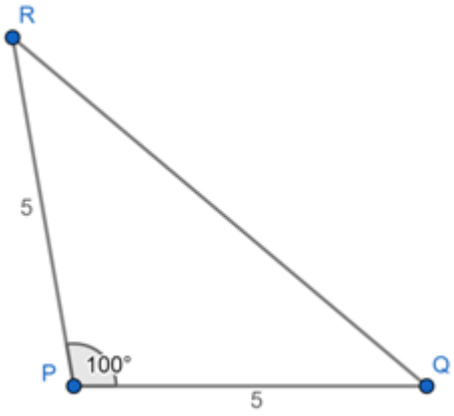
Answer

Rough Diagram:



Construction Steps:

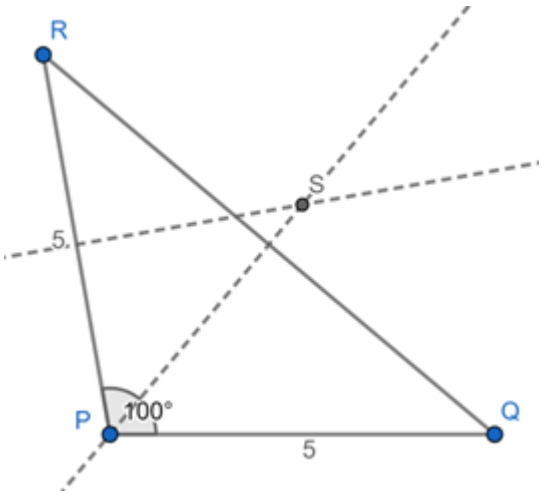
Step 1: Draw the ΔABC with the given measurements.



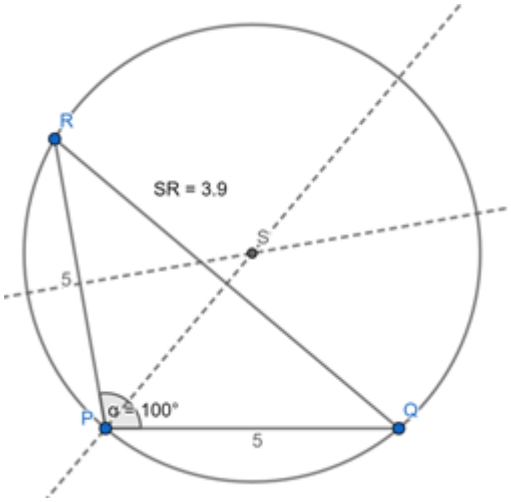
Step 2:

We know that the circum centre for an obtuse angled triangle lies outside the triangle.

Construct the perpendicular bisector of any two sides (PR and QR) and let them meet at S which is circum centre.



Step 3: With S as centre and SP = SQ = SR as radius draw the circum circle to pass through P, Q and R.



∴ The required circum circle for the given triangle is drawn above.

2. Question

Draw the circumcircle for

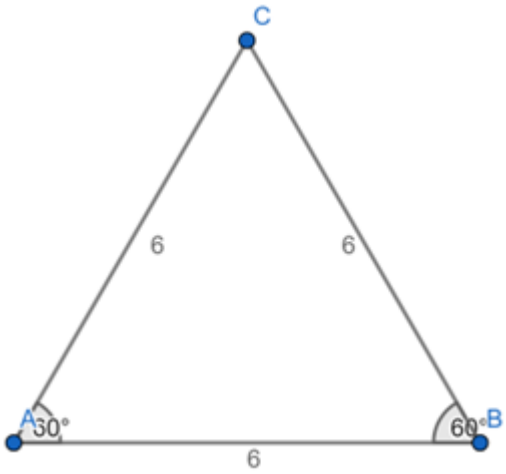
i. an equilateral triangle of side 6cm.

ii. an isosceles right triangle having 5cm as the length of the equal sides.

Answer

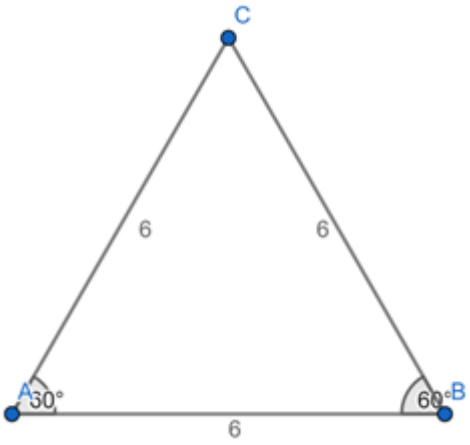
i. An equilateral triangle has all its angles 60°.

Rough Diagram:



Construction Steps:

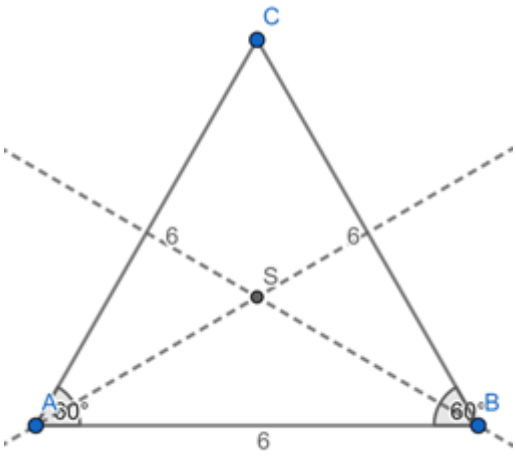
Step 1: Draw the ΔABC with the given measurements.



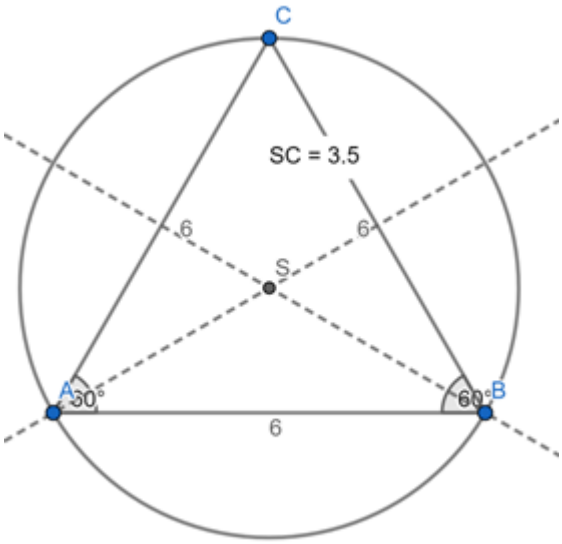
Step 2:

We know that the circum centre of an acute angled triangle lies inside the triangle.

Construct the perpendicular bisector of any two sides (BC and AC) and let them meet at S which is circum centre.



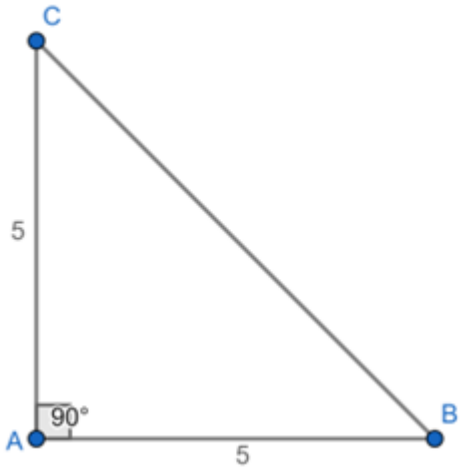
Step 3: With S as centre and SA = SB = SC as radius draw the circum circle to pass through A, B and C.



∴ The required circum circle for the given triangle is drawn above.

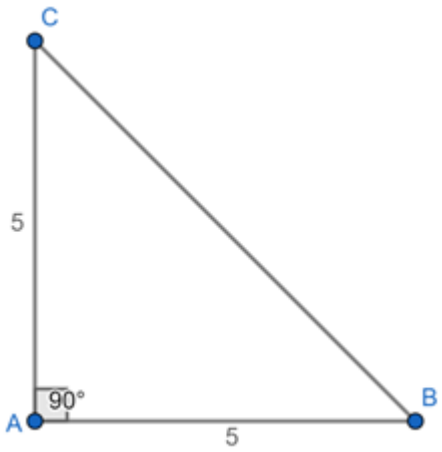
ii. Let ∠A be 90° in an isosceles right triangle and AB and AC be the equal sides having length 5 cm.

Rough Diagram:



Construction Steps:

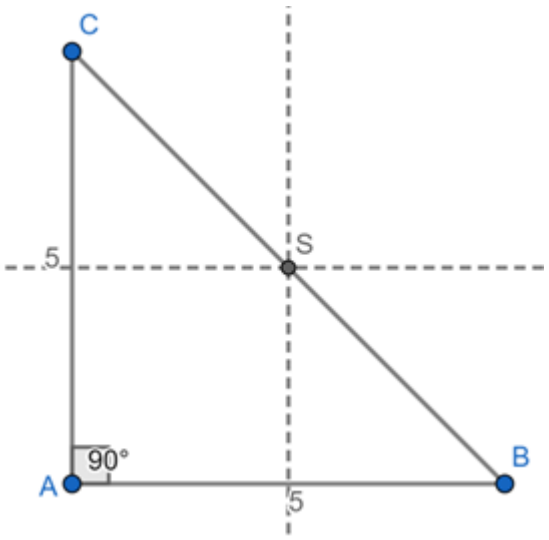
Step 1: Draw the ΔABC with the given measurements.



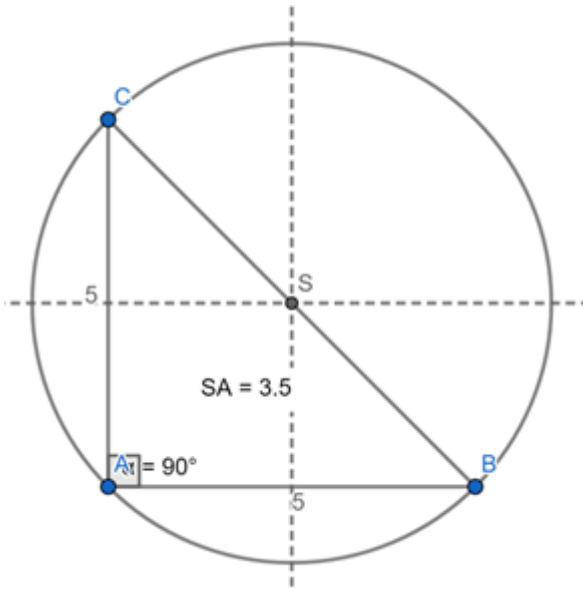
Step 2:

We know that the circum centre of a right angled triangle is at the midpoint of its hypotenuse.

Construct the perpendicular bisector of any two sides (AC and AB) and let them meet at S which is circum centre.



Step 3: With S as centre and SA = SB = SC as radius draw the circum circle to pass through A, B and C.



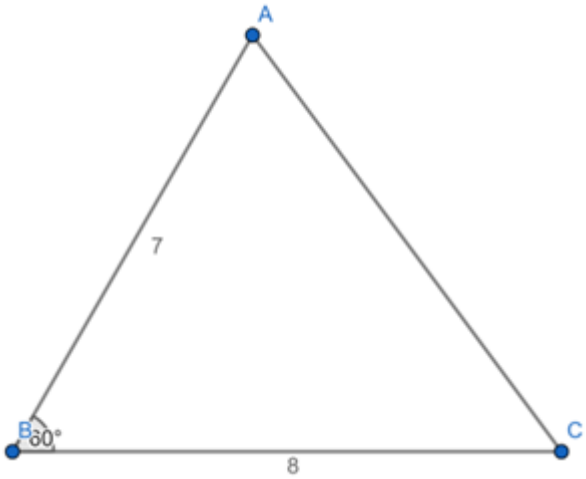
∴ The required circum circle for the given triangle is drawn above.

3. Question

Draw ΔABC, where AB = 7 cm, BC = 8 cm and ∠B = 60° and locate its circumcentre.

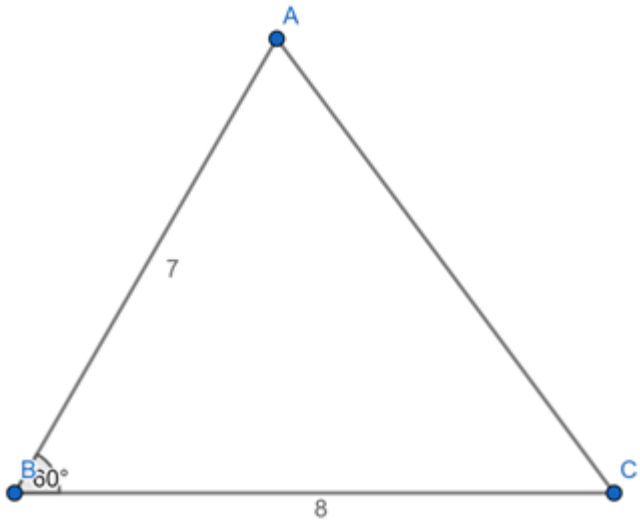
Answer

Rough Diagram:

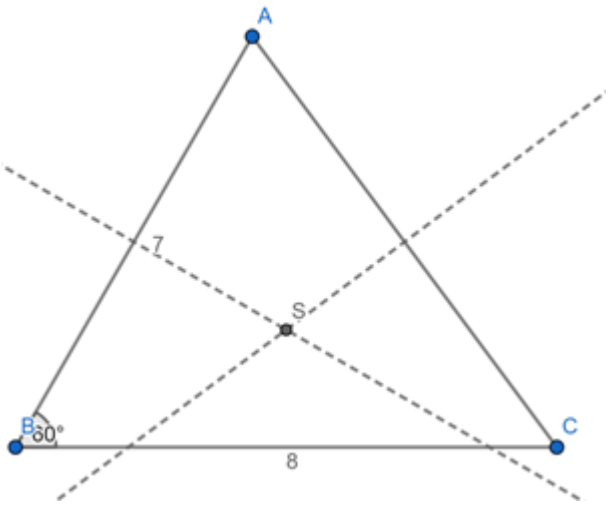


Construction Steps:

Step 1: Draw the ΔABC with the given measurements.



Step 2: Construct the perpendicular bisector of any two sides (AC and AB) and let them meet at S which is circum centre.



We know that the circum centre of an acute angled triangle lies inside the triangle.

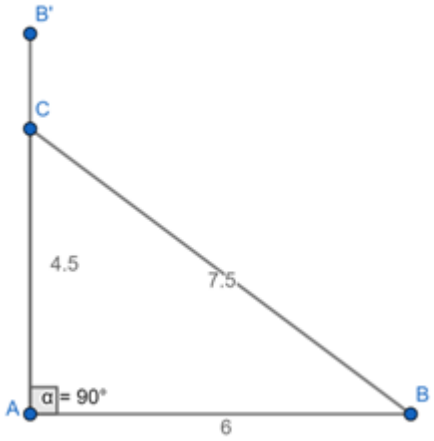
∴ In the above triangle, S is the required circum centre.

4. Question

Construct the right triangle whose sides are 4.5cm, 6cm and 7.5cm. Also locate its circumcentre.

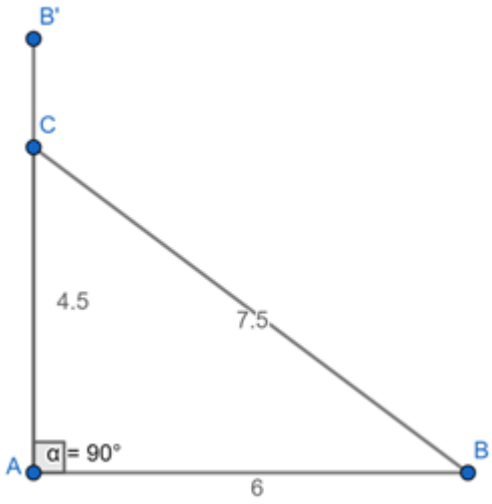
Answer

Rough Diagram:

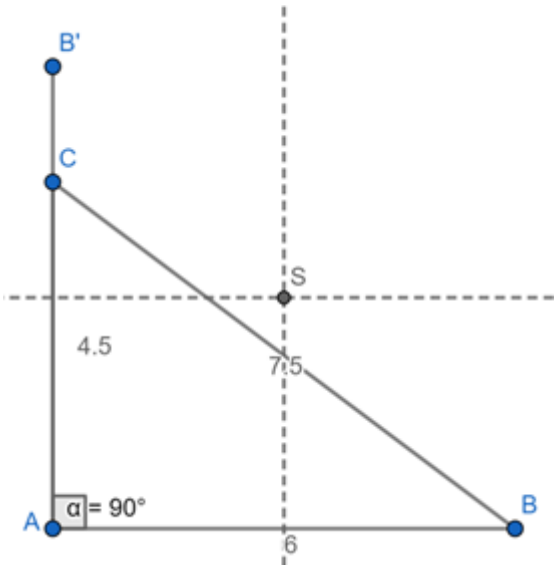


Construction Steps:

Step 1: Draw the ΔABC with the given measurements.



Step 2: Construct the perpendicular bisector of any two sides (AC and AB) and let them meet at S which is circum centre.



We know that the circum centre of a right angled triangle is at the midpoint of its hypotenuse.

∴ In the above triangle, S is the required circum centre.

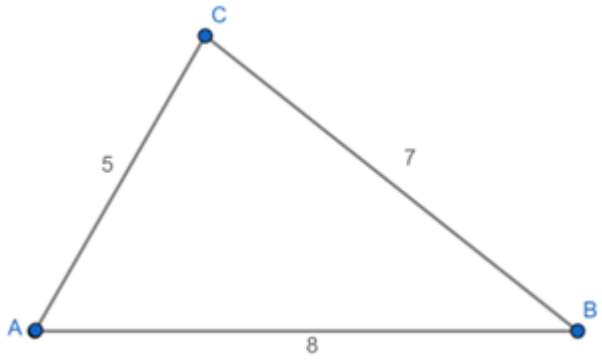
Exercise 6.2

1. Question

Draw ΔABC with sides AB = 8 cm, BC = 7 cm and AC = 5 cm and construct its orthocentre.

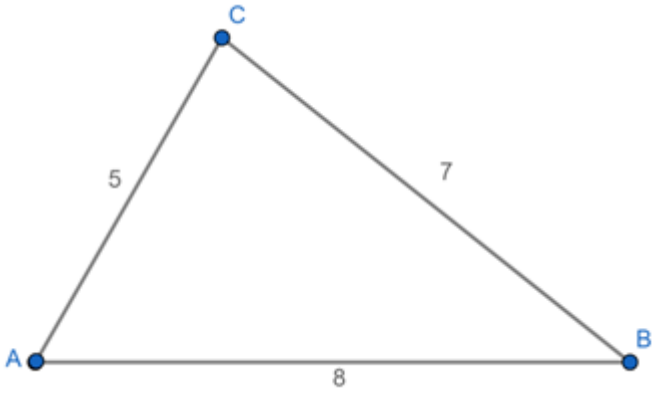
Answer

Rough Diagram:

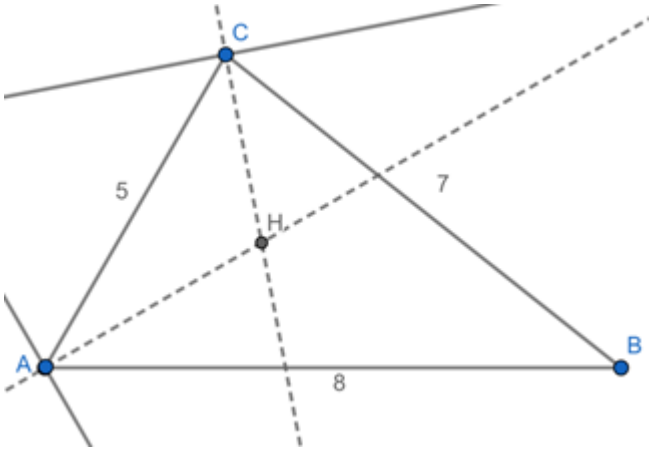


Construction Steps:

Step 1: Draw the ΔABC with the given measurements.



Step 2: Construct altitudes from any two vertices (A and C) to their opposite sides (BC and AB) respectively.



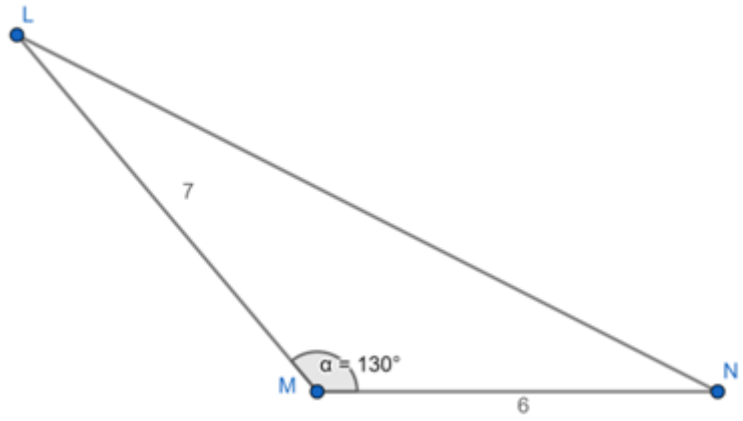
The point of intersection of the altitudes H is the orthocenter of the given ΔABC.

2. Question

Construct the orthocentre of ΔLMN, where LM = 7 cm, ∠M = 130° and MN = 6cm.

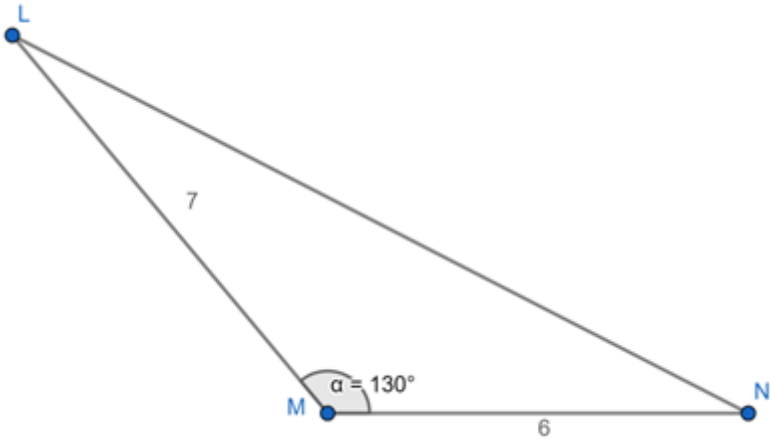
Answer

Rough Diagram:

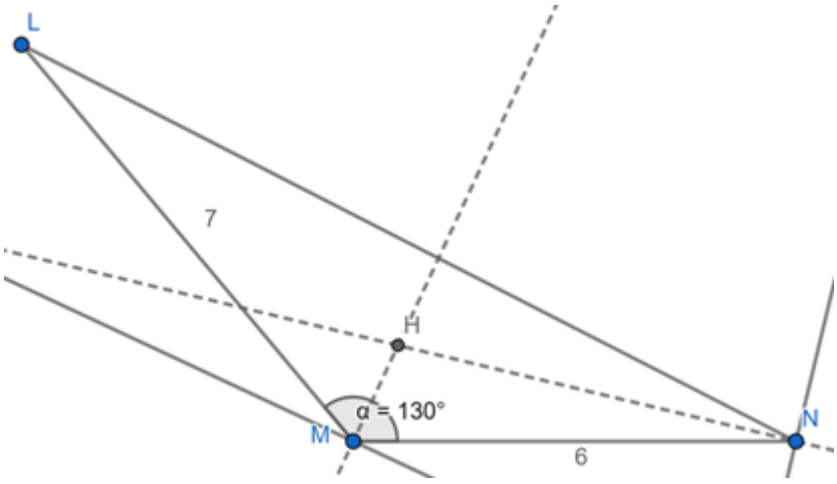


Construction Steps:

Step 1: Draw the ΔLMN with the given measurements.



Step 2: Construct altitudes from any two vertices (M and N) to their opposite sides (LN and LM) respectively.



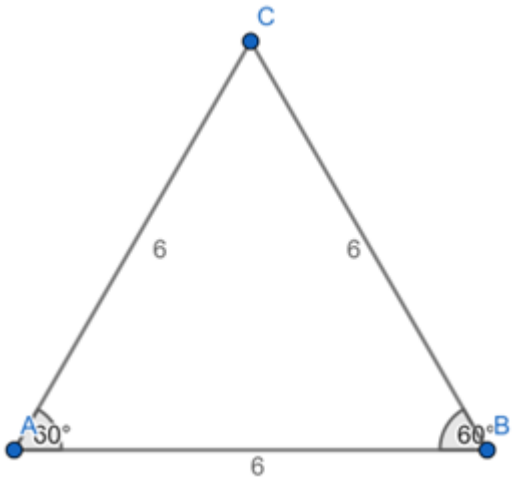
The point of intersection of the altitudes H is the orthocenter of the given ΔLMN.

3. Question

Construct an equilateral triangle of sides 6 cm and locate its orthocentre.

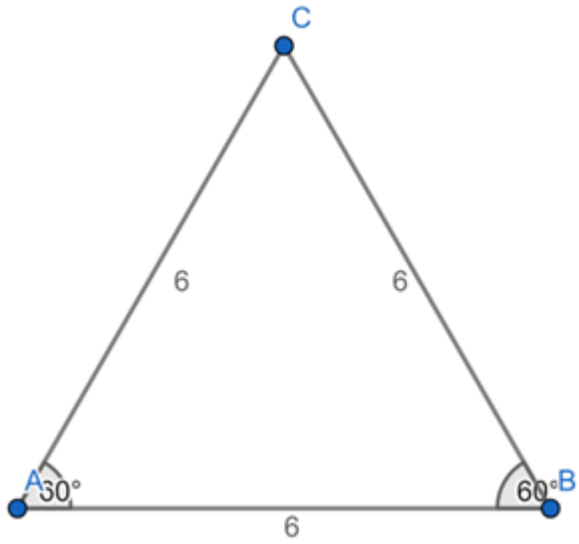
Answer

Rough Diagram:

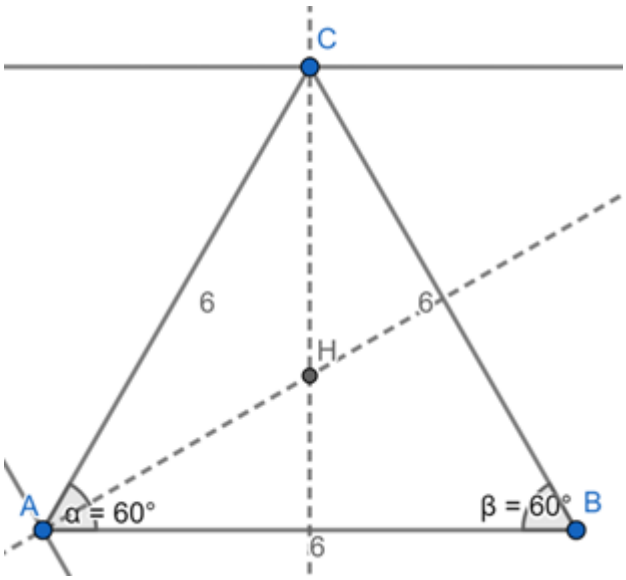


Construction Steps:

<u>Step 1:</u> Draw the ΔABC with the given measurements.



<u>Step 2:</u> Construct altitudes from any two vertices (A and C) to their opposite sides (BC and AB) respectively.



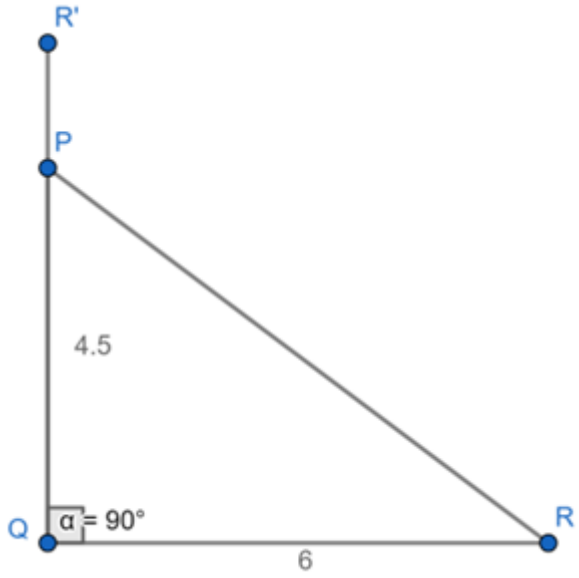
The point of intersection of the altitudes H is the orthocenter of the given ΔABC.

4. Question

Draw and locate the orthocentre of a right triangle PQR right angled at Q, with PQ = 4.5 cm and QR = 6 cm.

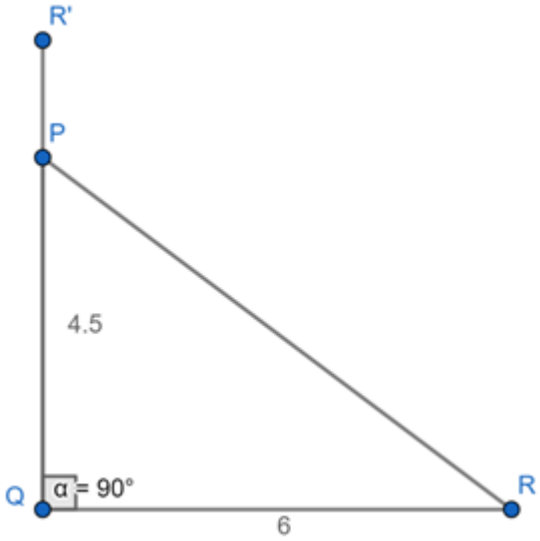
Answer

Rough Diagram:

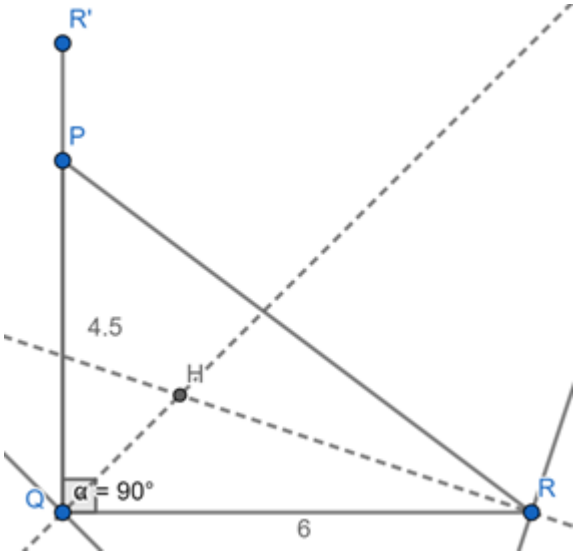


Construction Steps:

Step 1: Draw the ΔPQR with the given measurements.



Step 2: Construct altitudes from any two vertices (Q and R) to their opposite sides (PR and PQ) respectively.



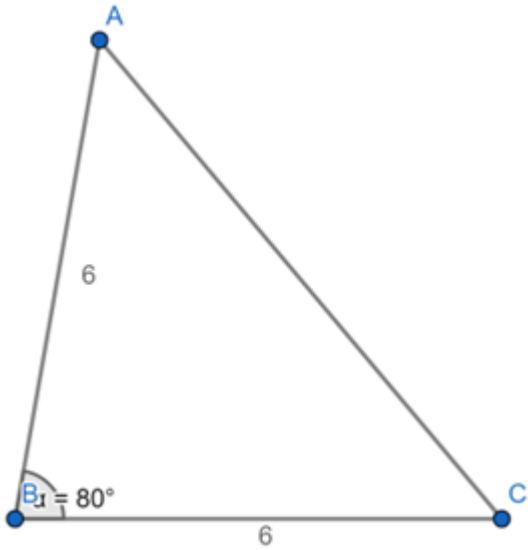
The point of intersection of the altitudes H is the orthocenter of the given ΔPQR.

5. Question

Construct an isosceles triangle ABC with sides AB = BC = 6 cm and ∠B = 80° and locate its orthocentre.

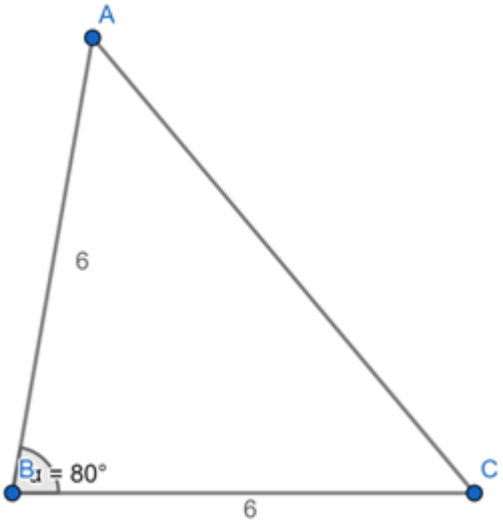
Answer

Rough Diagram:

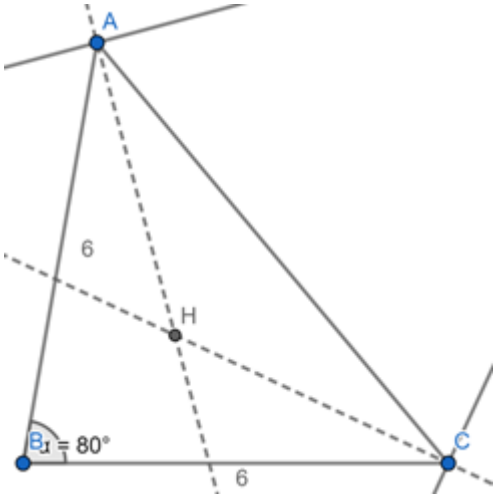


Construction Steps:

<u>Step 1:</u> Draw the ΔABC with the given measurements.



Step 2: Construct altitudes from any two vertices (A and C) to their opposite sides (BC and AB) respectively.



The point of intersection of the altitudes H is the orthocenter of the given ΔABC.