4. Practical geometry

Exercise 4.1

1. Question

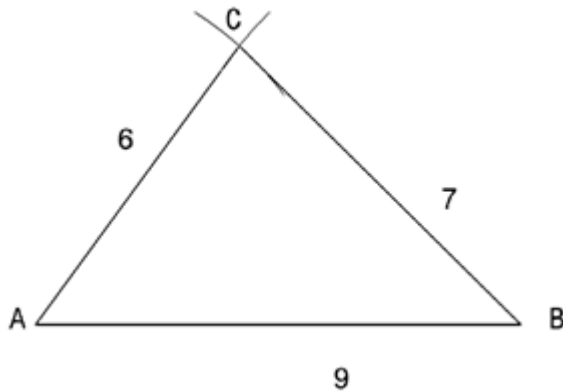Draw the incircle of ΔABC, where AB = 9cm, BC = 7cm, and AC = 6cm.

Answer

We need to know about what is incircle.

When a circle is completely inscribed in any figures (square, rectangle, triangle, etc.,). Then that is known as incircle. Radius of that circle is known as Inradius.

STEP-1:

Draw a line segment AB with 9cm and take that as base. Take B as Centre and draw an arc with 7cm radius, taking A as Centre draw an arc with 6 cm that should cut the previous arc. Name the intersection point as C and connect it to A, B. Thus triangle is formed.
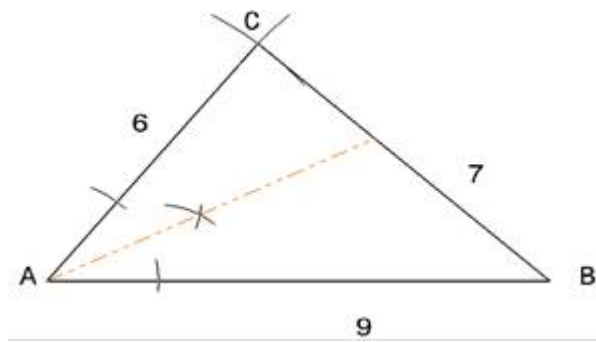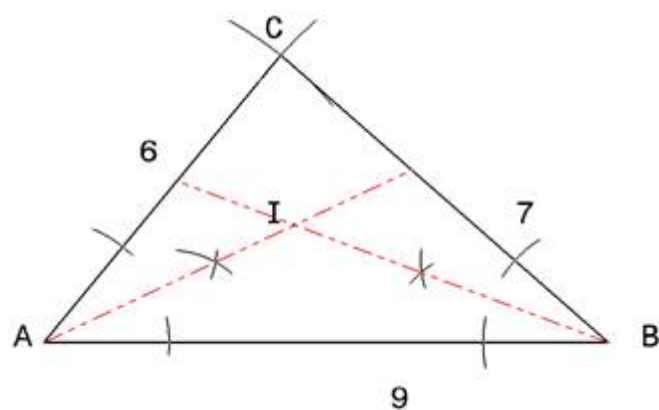

STEP-2:

Construct the angular bisector for ∠ CAB

Taking A as Centre and with any radius draw an arc on the line segments AB, AC. From both the intersected points again draw arcs in the circle. Both the arcs should bisect each other.

Draw a line from A to the opposite side through the intersection point.

STEP-3:

We need two angular bisectors to draw an incircle. So, we draw another angular bisector from ∠ CBA by following the similar procedures. Where the two angular bisectors meet name the point as I. That is the Centre for the incircle.
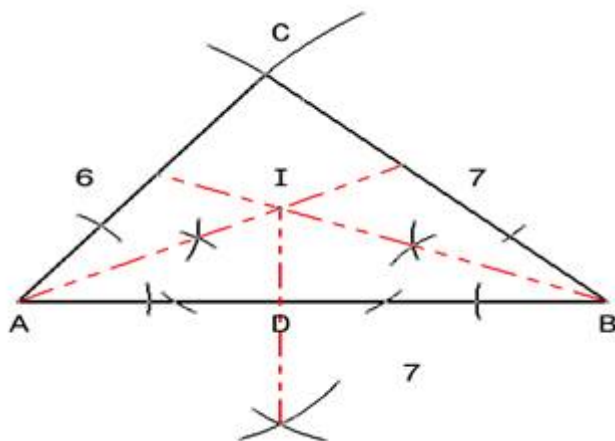

STEP-4:

Draw an perpendicular bisector with the external point I

For this we need to draw an arc with any radius and cut the line segment AB.
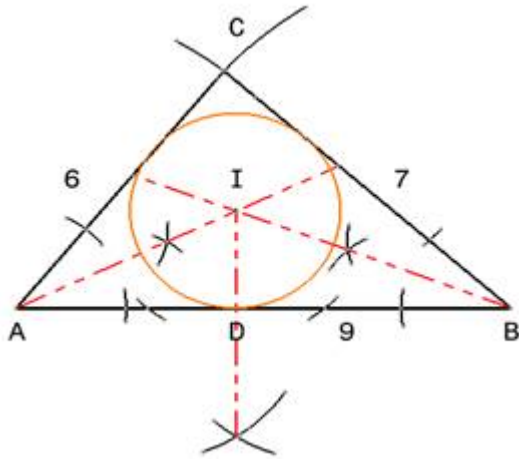
From the intersection points taking more than the half the distance between the points. Draw an arc that should bisector each other.

Connect the point with I. name the point that the line meeting with segment AB as D

STEP-5:

With ID as radius and I as Centre draw a circle that will be inscribed in a circle.

Thus, incircle is drawn with the given dimensions.

2. Question

Draw the incircle of ΔABC in which AB = 6cm, AC = 7cm and ∠A = 40° Also find its inradius.

Answer

Step-1:

Draw a line segment AC with 7cm and take that as base. Take A as Centre and draw an arc with 6cm radius, taking A as Centre draw ray of 40º that should cut the previous arc. Name the intersection point as B and connect it to C. Thus, triangle is formed.
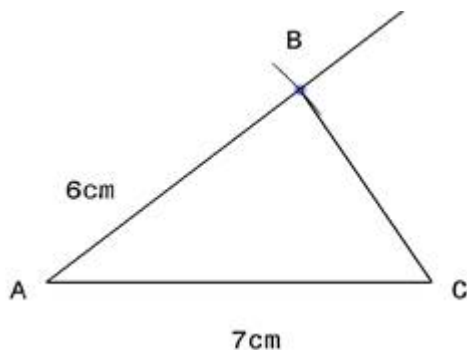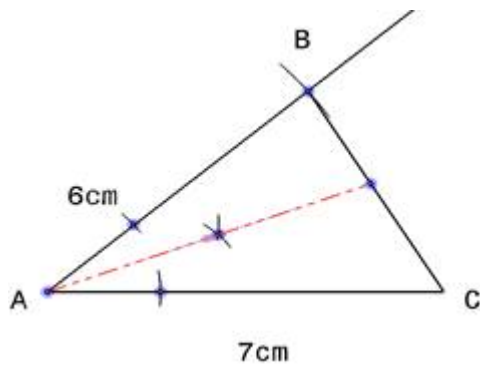

STEP-2:

Construct the angular bisector for ∠ BAC

Taking A as Centre and with any radius draw an arc on the line segments AB, AC. From both the intersected points again draw arcs in the circle. Both the arcs should bisect each other.

Draw a line from A to the opposite side through the intersection point.

STEP-3:

We need two angular bisectors to draw an incircle. So, we draw another angular bisector from ∠BCA by following the similar procedures. Where the two angular bisectors meet name the point as I. That is the Centre for the incircle.
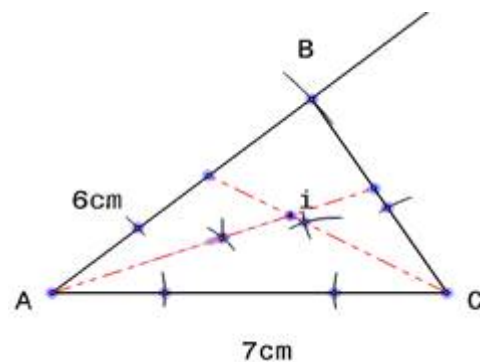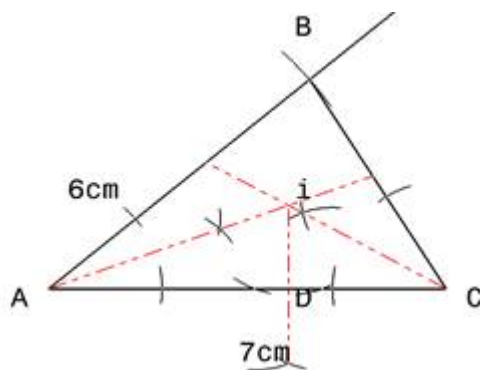

STEP-4:

Draw an perpendicular bisector with the external point I

For this we need to draw an arc with any radius and cut the line segment AC.
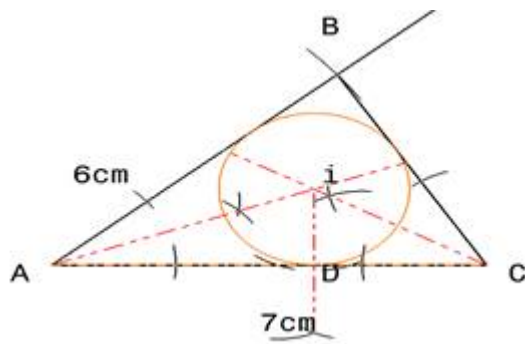
From the intersection points taking more than the half the distance between the points. Draw an arc that should bisector each other.

Connect the point with I. name the point that the line meeting with segment AC as D

STEP-5:

With ID as radius and I as Centre draw a circle that will be inscribed in a circle.

Thus, incircle is drawn with the given dimensions.
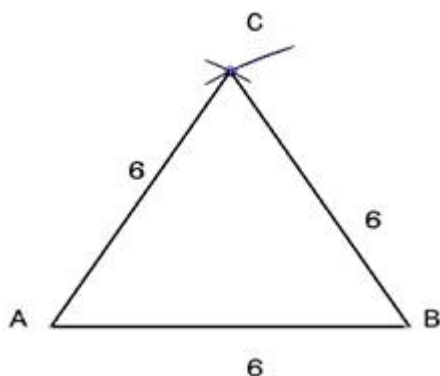
From the figure we got the inradius as 1.50cm

3. Question

Construct an equilateral triangle of side 6cm and draw its incircle.

Answer

STEP-1:

Draw a line segment AB with 6cm and take that as base. Take B as Centre and draw an arc with 6cm radius, taking A as Centre draw an arc with 6 cm that should cut the previous arc. Name the intersection point as C and connect it to A, B. Thus, equilateral triangle is formed.
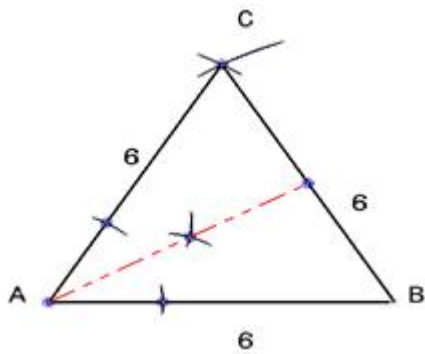

STEP-2:

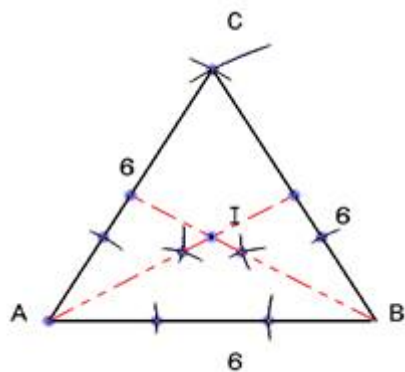Construct the angular bisector for ∠ CAB

Taking A as Centre and with any radius draw an arc on the line segments AB, AC. From both the intersected points again draw arcs in the circle. Both the arcs should bisect each other.

Draw a line from A to the opposite side through the intersection point.

STEP-3:

We need two angular bisectors to draw an incircle. So, we draw another angular bisector from ∠ CBA by following the similar procedures. Where the two angular bisectors meet name the point as I. That is the Centre for the incircle.
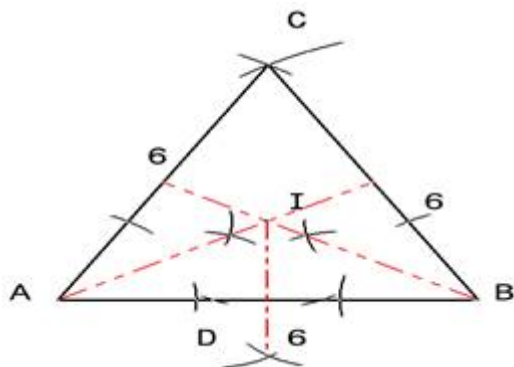

STEP-4:

Draw an perpendicular bisector with the external point I

For this we need to draw an arc with any radius and cut the line segment AB.

From the intersection points taking more than the half the distance between the points. Draw an arc that should bisector each other.
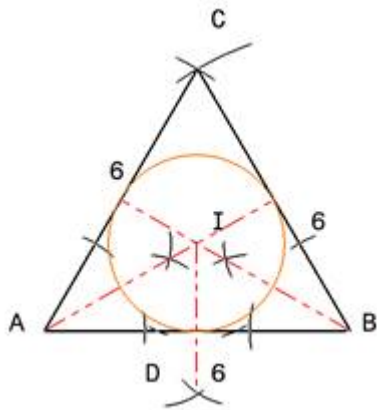
Connect the point with I. name the point that the line meeting with segment AB as D

STEP-5:

With ID as radius and I as Centre draw a circle that will be inscribed in a circle.

Thus, incircle is drawn with the given dimensions.

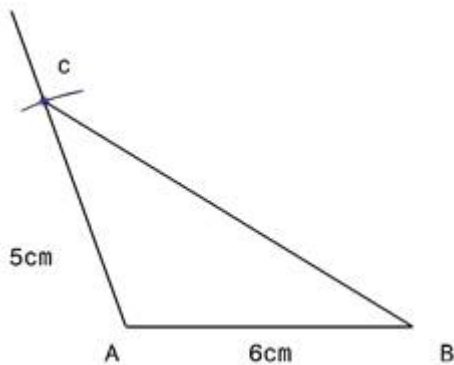Thus, incircle is drawn with the given dimensions.

5. Question

Construct ΔABC in which AB = 6cm, AC = 5cm and ∠A = 110°. Locate its incentre and draw the incircle.

Answer

Step-1:

Draw a line segment AB with 6cm and take that as base. Take A as Centre and draw an arc with 5cm radius, taking A as Centre draw ray of 110^0 that should cut the previous arc. Name the intersection point as C and connect it to B. Thus, triangle is formed.
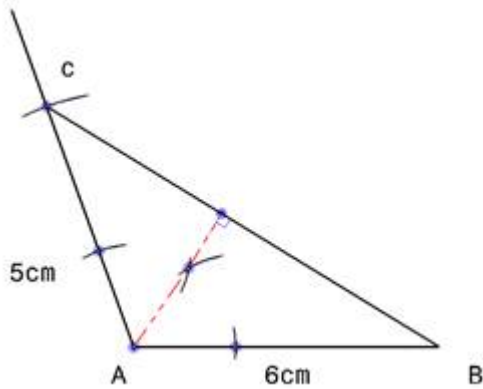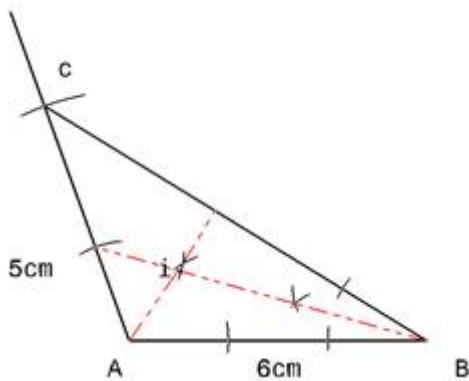

STEP-2:

Construct the angular bisector for ∠ CAB

Taking A as Centre and with any radius draw an arc on the line segments AB, AC. From both the intersected points again draw arcs in the circle. Both the arcs should bisect each other.

Draw a line from A to the opposite side through the intersection point.

STEP-3:

We need two angular bisectors to draw an incircle. So, we draw another angular bisector from ∠CBA by following the similar procedures. Where the two angular bisectors meet name the point as I. That is the Centre for the incircle.
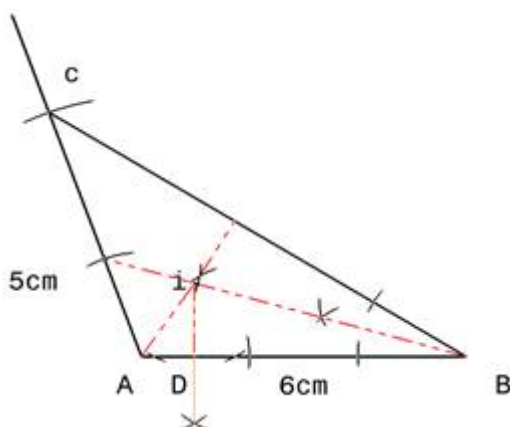

STEP-4:

Draw an perpendicular bisector with the external point I

For this we need to draw an arc with any radius and cut the line segment AB.
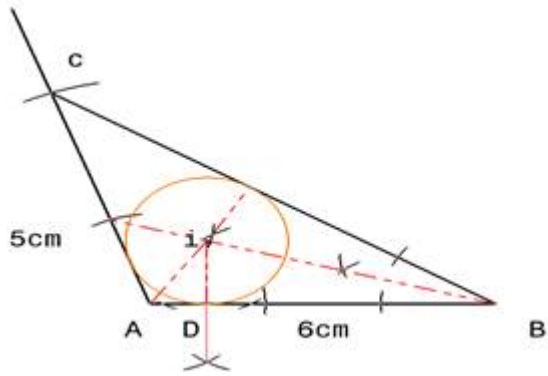
From the intersection points taking more than the half the distance between the points. Draw an arc that should bisector each other.

Connect the point with I. name the point that the line meeting with segment AB as D

STEP-5:

With ID as radius and I as Centre draw a circle that will be inscribed in a circle.

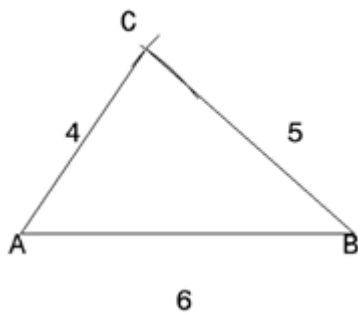Thus, incircle is drawn with the given dimensions.

Exercise 4.2

1. Question

Construct the ΔABC such that AB = 6cm, BC = 5cm and AC = 4cm and locate its centroid.
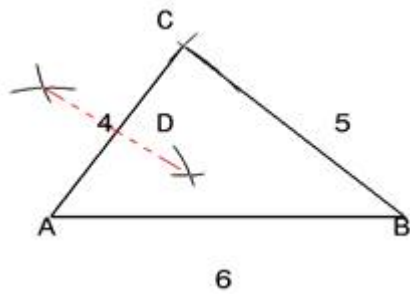
Answer

STEP-1:

Draw a line segment AB with 6cm and take that as base. Take B as Centre and draw an arc with 5cm radius, taking A as Centre draw an arc with 4 cm that should cut the previous arc. Name the intersection point as C and connect it to A, B. Thus, triangle is formed.
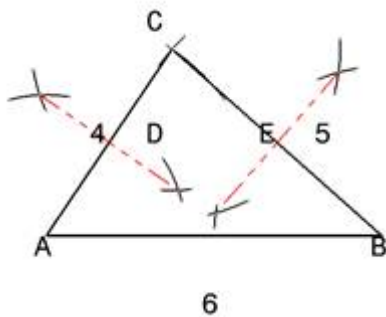

STEP-2:

Draw perpendicular bisector for any two sides

We take AC side. Taking more than half of AC we draw arc on adjacent sides of line segment and from both the ends of the line segment (AC) and we connect the intersected points. Name the midpoint as D
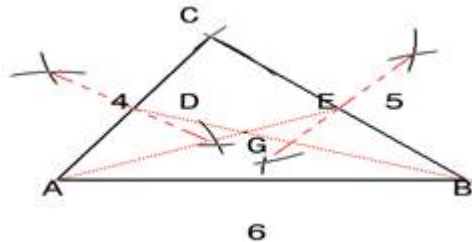
STEP-3

In the same way we draw perpendicular bisector for BC. Name the midpoint as E

STEP-4:

Draw the medians AE, BD and name the meeting point is the centroid G

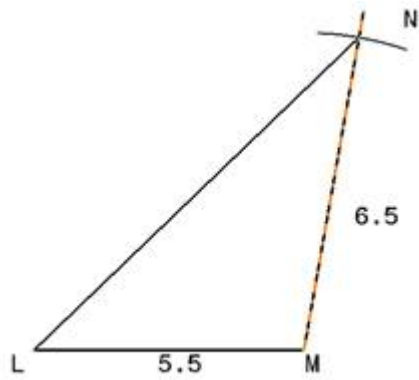Thus, we have constructed centroid (G)

2. Question

Draw and locate the centroid of triangle LMN with LM = 5.5cm, $\angle M = 100^0$, MN = 6.5cm.
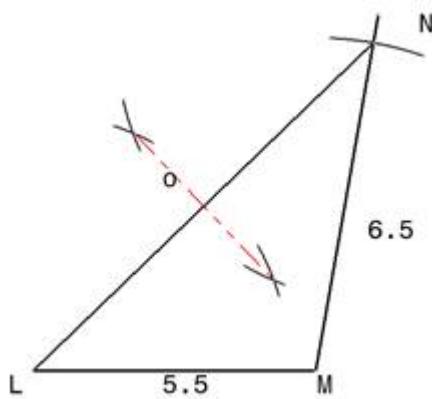
Answer

Step-1:

Draw a line segment LM with 5.5cm and take that as base. Take M as Centre and draw an arc with 6.5cm radius, taking M as Centre draw ray of 100⁰ that should cut the previous arc. Name the intersection point as N and connect it to L. Thus, triangle is formed.
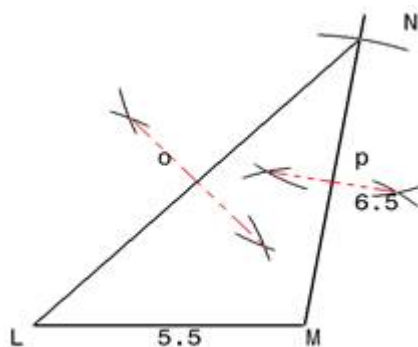
STEP-2:

Draw perpendicular bisector for any two sides

We take LN side. Taking more than half of LN we draw arc on adjacent sides of line segment and from both the ends of the line segment (LN) and we connect the intersected points. Name the midpoint as O
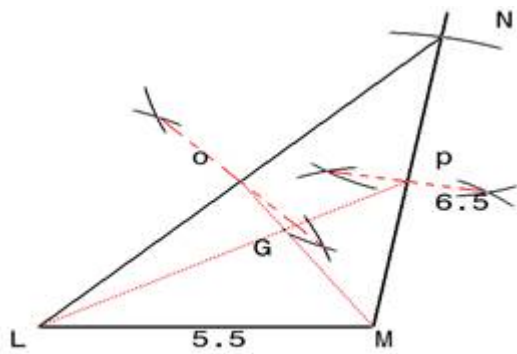

STEP-3

In the same way we draw perpendicular bisector for MN. Name the midpoint as P

STEP-4:

Draw the medians LP, MO and name the meeting point is the centroid G
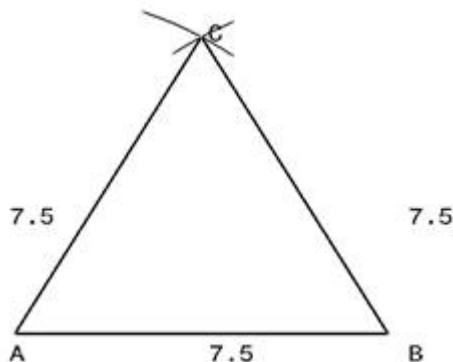
Thus, we have constructed centroid (G).

3. Question

Draw a equilateral triangle of side 7.5cm and locate the centroid.
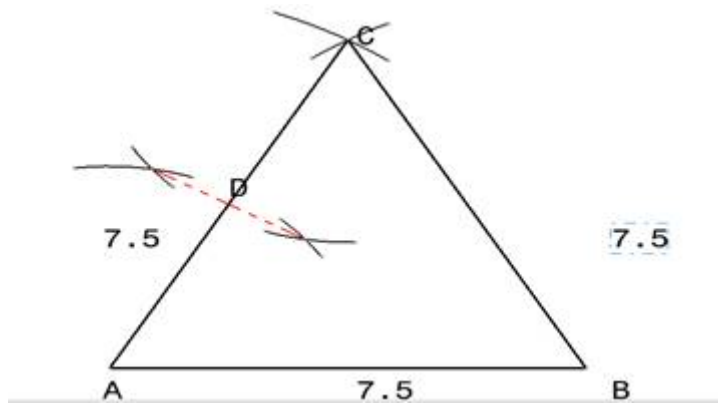
Answer

STEP-1:

Draw a line segment AB with 7.5cm and take that as base. Take B as Centre and draw an arc with 7.5cm radius, taking A as Centre draw an arc with 7.5 cm that should cut the previous arc. Name the intersection point as C and connect it to A, B. Thus, equilateral triangle is formed.
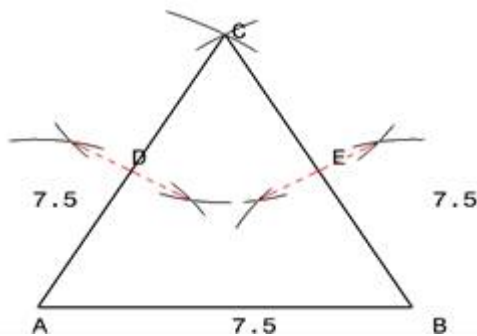

STEP-2:

Draw perpendicular bisector for any two sides

We take AC side. Taking more than half of AC we draw arc on adjacent sides of line segment and from both the ends of the line segment (AC) and we connect the intersected points. Name the midpoint as D
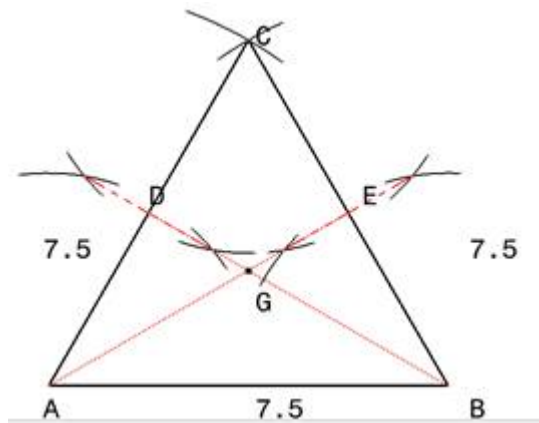
STEP-3

In the same way we draw perpendicular bisector for MN. Name the midpoint as P

STEP-4:

Draw the medians LP, MO and name the meeting point is the centroid G

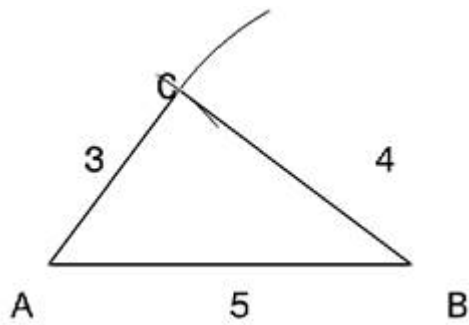Thus, we have constructed centroid (G).

4. Question

Draw the right triangle whose sides are 3cm, 4cm and 5cm and construct its centroid.

Answer

STEP-1:

Draw a line segment AB with 5cm and take that as base. Take B as Centre and draw an arc with 4cm radius, taking A as Centre draw an arc with 3cm that
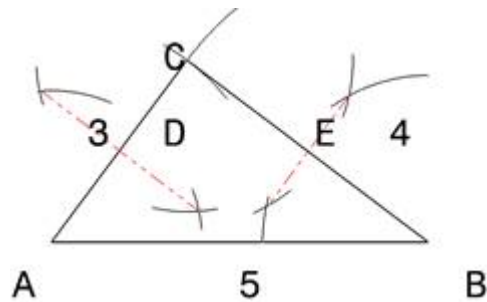
should cut the previous arc. Name the intersection point as C and connect it to A, B. Thus, triangle is formed.
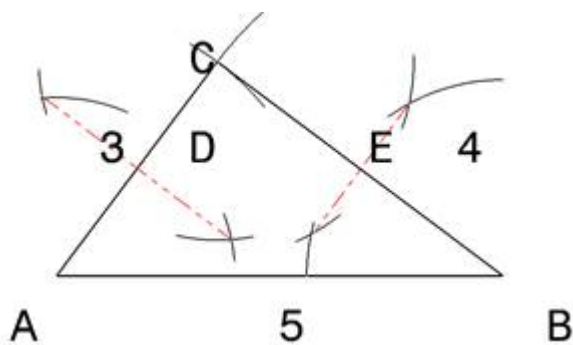

STEP-2:

Draw perpendicular bisector for any two sides

We take AC side. Taking more than half of AC we draw arc on adjacent sides of line segment and from both the ends of the line segment (AC) and we connect the intersected points. Name the midpoint as D
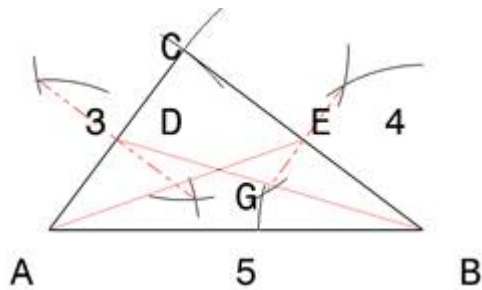

STEP-3

In the same way we draw perpendicular bisector for BC. Name the midpoint as E

STEP-4:

Draw the medians AE, BD and name the meeting point is the centroid G

Thus, we have constructed centroid (G)

5. Question

Draw the ΔPQR, where PQ = 6cm, ∠P = 110° and QR = 8cm and construct its centroid.

Answer

Step-1:

Draw a line segment PQ with 6cm and take that as base. Take Q as Centre and draw an arc with 8cm radius, taking P as Centre draw ray of 110° that should cut the previous arc. Name the intersection point as R and connect it to Q. Thus, triangle is formed.
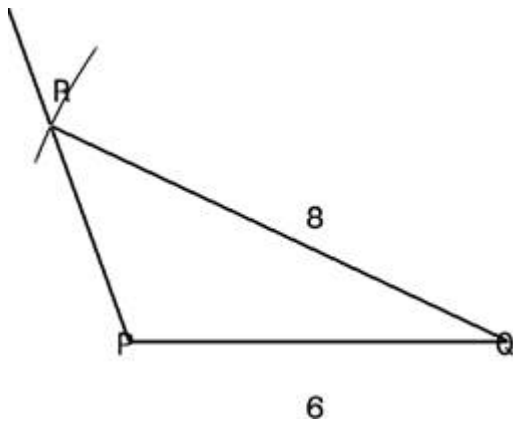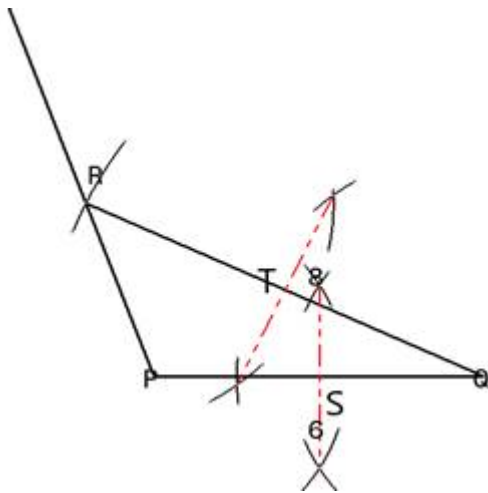

STEP-2:

Draw perpendicular bisector for any two sides

We take QR side. Taking more than half of QR we draw arc on adjacent sides of line segment and from both the ends of the line segment (QR) and we connect the intersected points. Name the midpoint as T
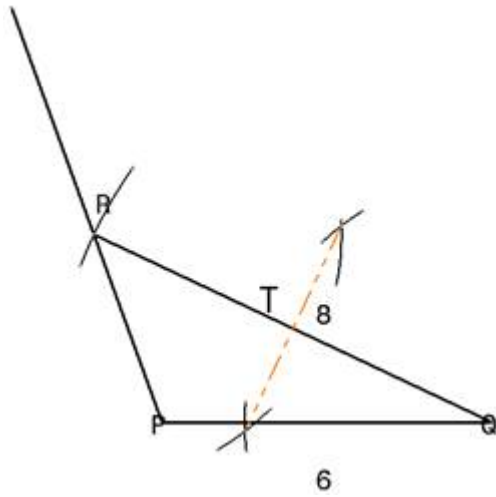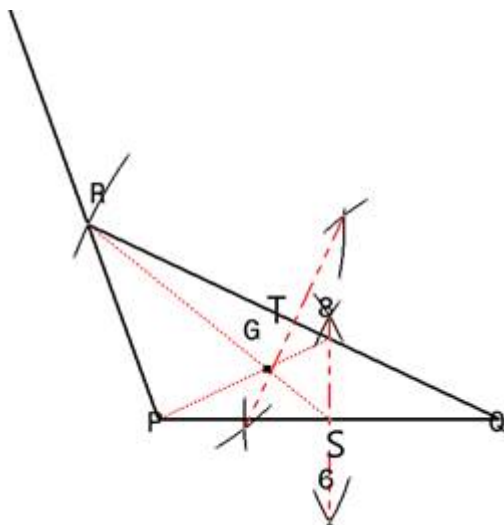
STEP-3

In the same way we draw perpendicular bisector for PQ. Name the

midpoint as S

STEP-4:

Draw the medians PT, QS and name the meeting point is the centroid G

Thus, we have constructed centroid (G).