Constructions – Circles

(Focus Area)

Construction 1: Constructing a square of same area as that of a rectangle

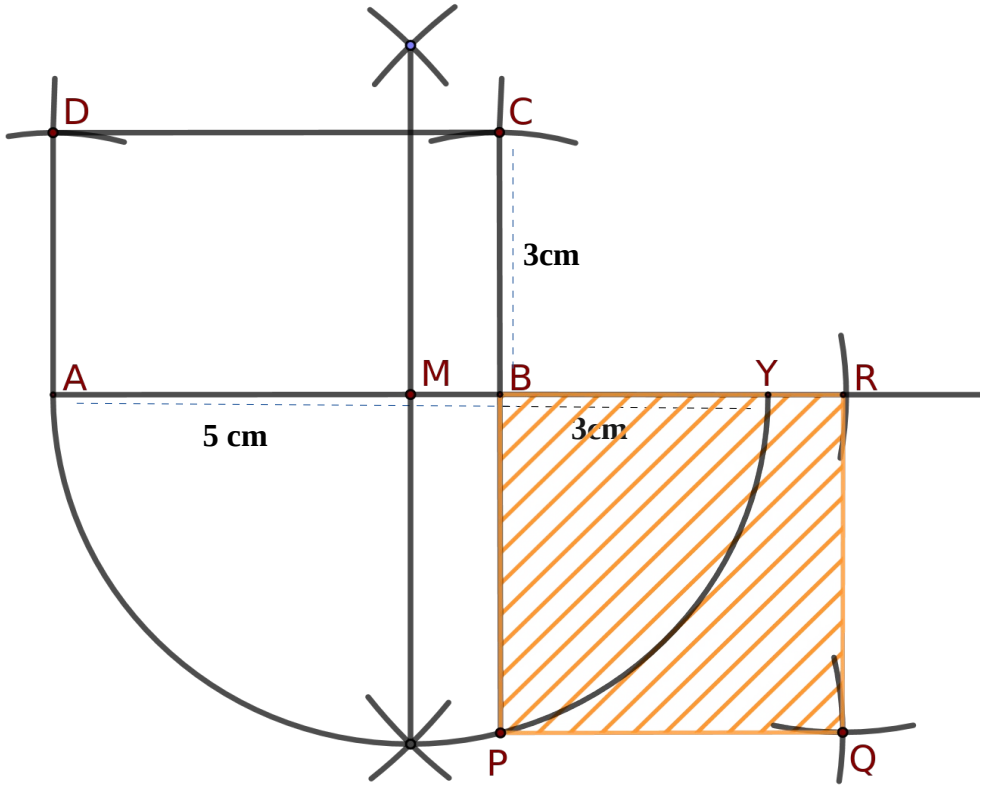
Q) Draw a rectangle of width 5 centimetres and height 3 centimetres and draw a square of the same area.

(Question can be asked in this way also->
Draw a rectangle having area 15 cm^2 and draw a square of the same area.)

(Hint: 5 × 3 = 15)

Ans) *Steps:*

1. *Draw line AB of length 5cm.*
2. *Draw perpendiculars at A & B, measure 3 centimetres on these lines. Complete rectangle ABCD.*
3. *Extend AB to Y such that BY = 3cm.*
4. *Draw the perpendicular bisector of AY.*
5. *Mark the midpoint of AY as M*
6. *Now draw a semicircle below ,with AY as diameter. Extend the right side CB of the rectangle to meet this semi circle at P.*
   This line BP is the side of the required square.
7. *Extend line BY, measure BP on your compass, using this measurement with B as centre draw an arc on this line and mark the point R.*
8. *With the same measurement draw arcs by keeping your compass at P & R .Let these arcs meet at Q. Complete the square BPQR.*



Assignment

1. Draw a rectangle of width 6 centimetres and height 4 centimetres and draw a square of the same area.
2. Draw a rectangle of area 18 cm^2 and draw a square of same area.
3. Draw a rectangle of width 7 centimetres and height 3 centimetres and draw a square of the same area.
4. Draw a rectangle of area 28 cm^2 and draw a square of same area.

Construction 2: Constructing a triangle when two angles and circumradius is given

Q) Draw a triangle of circumradius 3 centimetres and two of the angles 50 ° and 60 ° .

(Question can be asked in this way also->

Draw a circle of radius 3 cm. Draw a triangle with two angles 50 ° and 60 ° and the vertices are on this circle.)

Ans) Steps

Step1. Draw circle of radius 3cm

Step2. Draw radius OC

Step3. Measure 100^0 angle at O (Because double of 50^0 is 100^0)

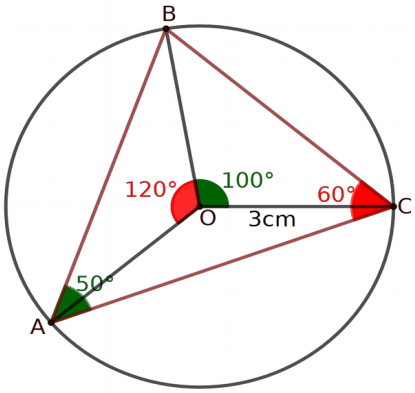
Step4. Draw OB

Step5. Measure 120^0 angle at O (Because double of 60^0 is 120^0)

Step6. Draw OA

Step7. Join AB, BC, AC

Step8. We get Δ ABC with $\angle A = 50^0$, $\angle C = 60^0$



Assignment

1. Draw a triangle of circumradius 3 centimetres and two of the angles 57 $\frac{1}{2}$ ° and 62 $\frac{1}{2}$ ° .
2. Draw a triangle of circumradius 5 centimetres and two of the angles 75 ° and 60 ° .
3. Draw a circle of radius 5.5 cm. Draw a triangle with two angles 55 ° and 65 ° and the vertices are on this circle.

4. Draw a circle of radius 4 cm. Draw a triangle with two angles 30 ° and 70 ° and the vertices are on this circle.

5. Draw a circle of radius 5 cm. Draw an equilateral triangle with the vertices are on this circle.

Constructions – Tangents

(Focus Area)

Construction 1 : Drawing a tangent to the circle
(Using ruler and compass)

Q) Draw a circle of radius 3 cm . Mark a point P on the circle . Draw a tangent through P.

Steps :1) Draw the circle of radius 3 cm. Mark centre as O.

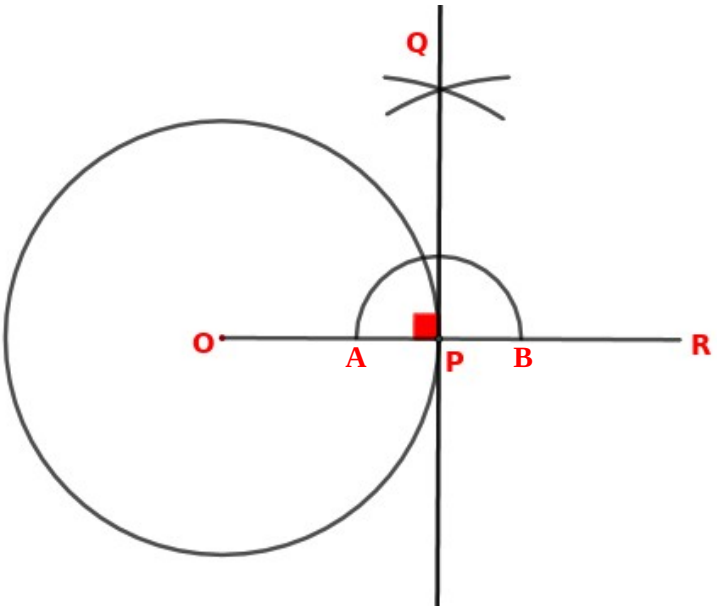
2) Mark a point P on this circle.

3) Draw radius OP. Extend this line to R.

4) Draw a semicircle with P as centre to cut OR at A & B.

5) Draw a pair of equidistant arcs from A & B. Let their point of intersection be Q.

6) Join QP. Extend this line. This line is the tangent to the circle at P.



Assignment

1. Draw a circle of radius 4 cm . Mark a point P on the circle . Draw a tangent through P.
2. Draw a circle of radius 5.5 cm . Mark a point A on the circle . Draw a tangent through A.
3. Draw a circle of radius 4.5 cm . Mark a point C on the circle . Draw a tangent through C.
4. Draw a circle of radius 3.5 cm . Mark a point P on the circle . Draw a tangent through P.
5. Draw a circle of radius 4 cm . Draw diameter AB. Draw tangents at A and B.

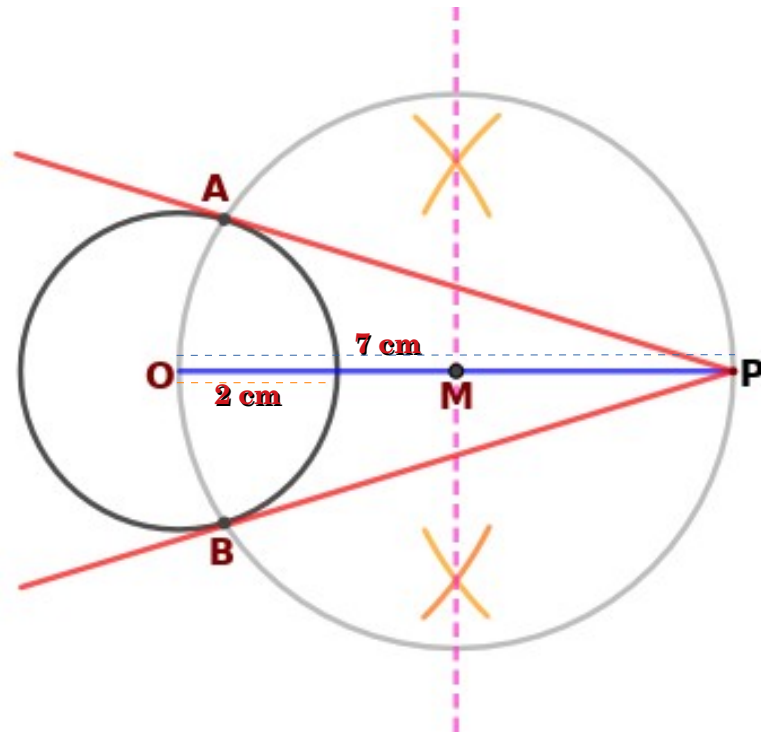
Construction 2 : Drawing tangents to a circle from a point outside the circle.

Q) Draw a circle of radius 2 cm. Mark a point P 7 cm away from the centre. Draw tangents to the circle from that point.

Ans)

Steps

1. Draw a circle of radius 2 cm, mark centre as O
2. Mark a point P at distance 7 cm from the centre. Join OP.
3. Draw the perpendicular bisector of OP, mark midpoint as M.
4. Draw a circle with centre M and radius MP. Mark the point of intersection of the circles as A & B.
5. Join PA & PB. PA & PB are the tangents to the circle.



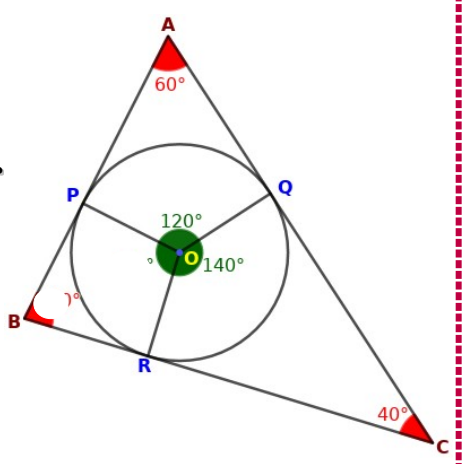
Assignment

1. Draw a circle of radius 3 cm and mark a point P 8 cm away from its centre. Draw two tangents from P and measure their length.
2. Draw a circle of radius 4 cm. Mark a point P at a distance 7 cm from the centre . Draw the tangents from P to the circle. Measure the length of the tangents.
3. Draw a circle of radius 3 cm. Mark a point 7 cm away from the centre . Draw the tangents from this point to the circle. Measure the length of the tangents.
4. Draw a circle of radius 4 cm and mark a point A 7 cm away from its centre. Draw two tangents from A and measure their length.
5. Draw a circle of radius 2 cm. Mark a point P 8 cm away from the centre. Draw tangents to the circle from that point.

Construction 3 : Drawing incircle of a triangle when two angles of the triangle are given

Q) Draw a circle of radius 2.5 centimetres. Draw a triangle of angles 40 ° ,60 ° with all its sides touching the circle.

Ans) Draw a rough figure.



From the figure we can find the other required measurements.

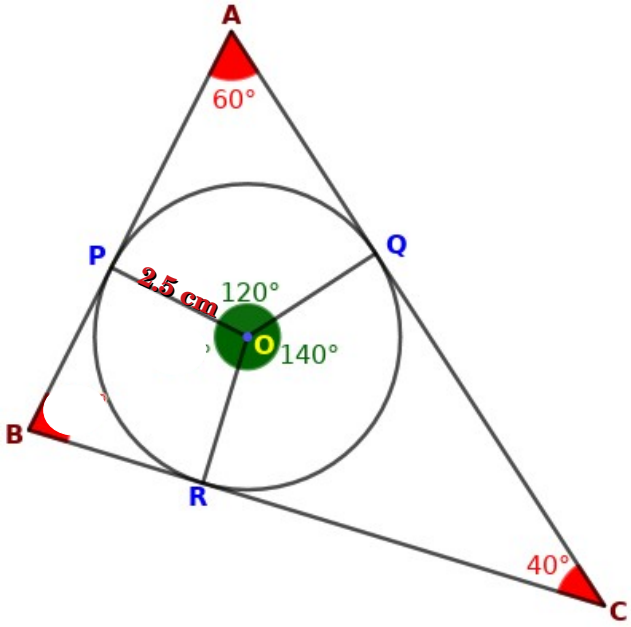
In ΔABC

∠C = 40°, ∴ ∠ROQ =180°– 40°= 140°

∠A = 60°, ∴ ∠POQ =180°– 60°= 120°

Steps :

1) Draw a circle of radius 2.5 with centre O.
2) Draw the radius OP
3) Measure angle of 120° at O and draw radius OQ.
4) Measure angle of 140° at O and draw radius OR.
5) Draw tangents at P, Q & R and complete the triangle ABC



Assignment

1. Draw a circle of radius 3 centimetres. Draw a triangle of angles 50 ° , 70 ° with all its sides touching the circle.
2. Draw a circle of radius 3.5 centimetres. Draw a triangle of angles 60 ° , 75 ° with all its sides touching the circle.
3. Draw a circle of radius 3 centimetres. Draw a triangle of angles 30 ° , 110° with all its sides touching the circle.
4. Draw a triangle having angles 55 ° , 70 ° and inradius 4cm.
5. Draw a triangle having angles 40 ° , 60 ° and inradius 3cm.