

EXERCISE 10.3

Q.1 Two circles with radii 5cm and 4cm touch each other externally. Draw another circle with radius 2.5cm touching the first pair, externally.

Solution:

Radius of Circle A = $r_1 = 5\text{cm}$

Radius of Circle B = $r_2 = 4\text{cm}$

Radius of Circle C = $r_3 = 2.5\text{cm}$

Steps of construction:

Step 1: Draw a line segment \overline{PQ} $5\text{cm} + 4\text{cm} = 9\text{cm}$ long.

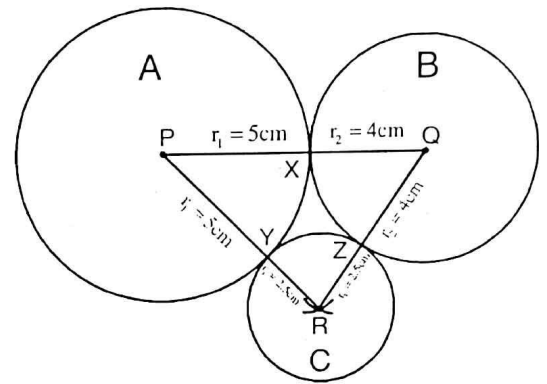
Step 2: Take 'P' as a centre and draw a circle of radius 5cm.

Step 3: Take 'Q' as a centre and draw a circle of radius 4cm, which intersects the circle of radius 4cm at point X.

Step 4: Take P as a centre and draw an arc of radius $(5\text{cm} + 2.5\text{cm} = 7.5\text{cm})$

Step 5: Take Q as a centre and draw an arc of radius $(4\text{cm} + 2.5\text{cm} = 6.5\text{cm})$, which intersects the previous arc at point R.

Step 6: Take R as centre and draw a circle of radius 2.5cm which touches externally the circles of centre P and Q at the points Y and Z respectively.

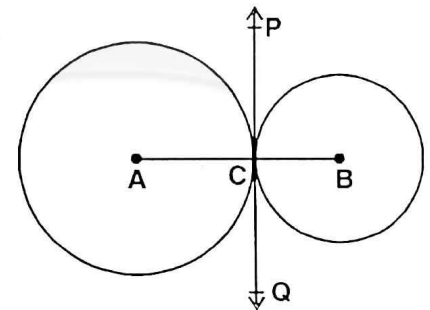


Q.2 If the distance between the centres of two circles is the sum or the difference of their radii they will touch each other.

Given: Two circles with centre A and B. \overline{AC} and \overline{BC} are radial segments of these circles such that $m\overline{AB} = m\overline{AC} + m\overline{BC}$ or

To Prove: Both circle touch each other.

Construction: Join A to B. Draw a tangent \overleftrightarrow{PQ} of circle A at point C
i.e. $m\angle PCA = 90^\circ$



Proof:

Statements	Reasons
$m\overline{AB} = m\overline{AC} + m\overline{BC}$(i)	Given
Points A, C and B are collinear such that C is between A and B.	From (i)
$m\angle PCA + m\angle PCB = 180^\circ$(ii)	Supplementary angles
As $m\angle PCA = 90^\circ$(iii)	Construction
$\therefore m\angle PCB = 90^\circ$(iv)	From (ii) and (iii)
$\overline{PC} \perp \overline{BC}$ at C i.e. \overline{PQ} is \perp \overline{BC} at C	From (iv)
\overline{PQ} is also a tangent of circle B	
\overline{PQ} is common tangent of both circles. i.e.	
Both circles have a common point C.	
Thus both circles touch each other at a point C.	
Similarly the same results can be proved when distance between the centers of two circles is equal to the difference of their radii	