



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:

Let A, B, C be the circles and their radii be r_1, r_2, r_3 respectively.

$$r_1 = 5\text{cm}$$

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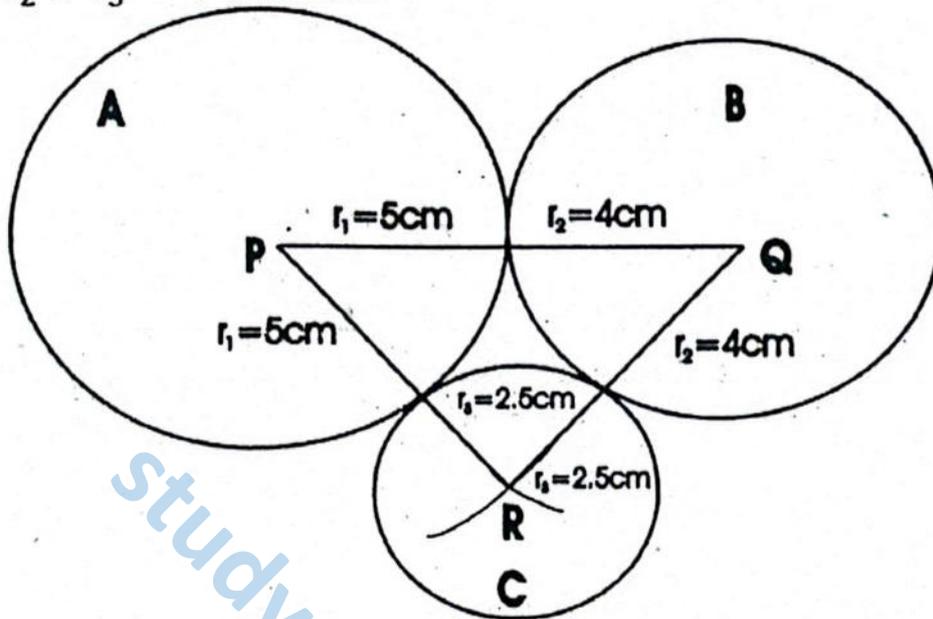


$$r_2 = 2.5\text{cm}$$

$$r_1 + r_2 = 5 + 4 = 9\text{ cm}$$

$$r_1 + r_3 = 5 + 2.5\text{ cm}$$

$$r_2 + r_3 = 4 + 2.5\text{ cm}$$

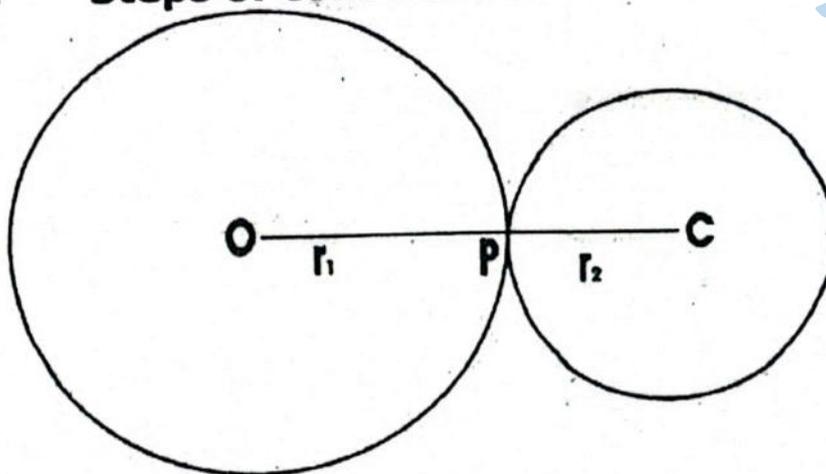


Steps of construction:

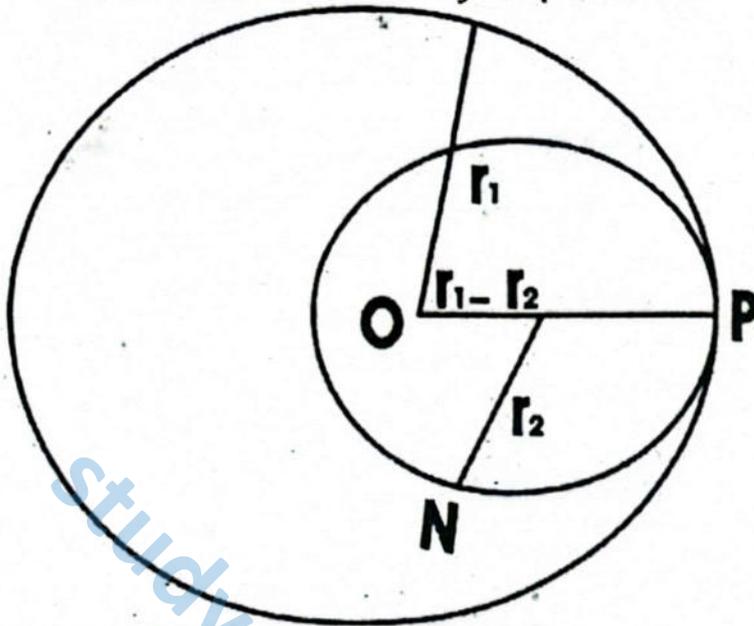
- (i) Draw a line segment \overline{PQ} of $5 + 4 = 9\text{ cm}$ long.
- (ii) Take P centre and a circle of radius 5cm .
- (iii) Take Q as centre and a circle of radius 4 cm .
- (iv) Take P as centre and draw an arc of radius $5 + 2.5 = 7.5\text{ cm}$.
- (v) Take R as centre and draw a circle of radius 2.5cm . This circle touches externally the circles with centre P and Q.

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

Solution: Steps of construction:



- (i) Let the two circles be with O and C as centres .
 Let their radii be r_1 and r_2 . Draw the two centres
 with $m\overline{OC}$ equal to $r_1 + r_2$ apart. These circles touch
 each other externally at point P .

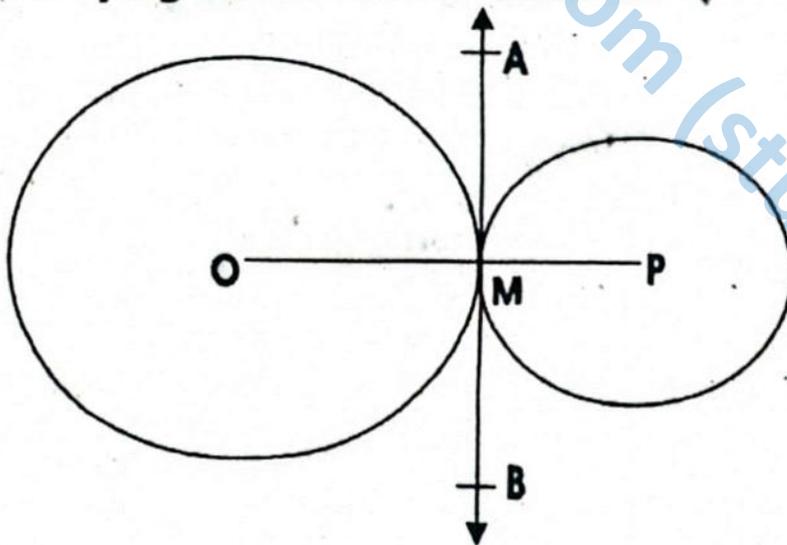


- (i) Let the two circles be with O and C as centres . Let their
 radii be r_1 and r_2 .

Take $m\overline{OC}$ $r_1 - r_2$ apart and draw the circles.

These circles touch each other internally at point P .

- Q.3** The point of contact of two circles will be the
 point lying on the line of centres.



Given:

The point of contact of circles with centres O and P is M ,

To prove:

Point of contact M lies on the line joins the centres.

Construct:

Join M to O and P .

Proof:

Statements	Reasons
\overline{OM} is radical and \overline{MA} tangent to the circle with centre O .	
$\therefore \overline{OM} \perp \overline{MA}$	
i.e., $m\angle OMA = 90^\circ$ (i)	
$m\angle PMA = 90^\circ$ (ii)	
Similarly	
$m\angle OMA + m\angle PMA = 90^\circ + 90^\circ$ $= 180^\circ$	From (i) + (ii)
Thus, \overline{OMP} is straight line segment.	

Thus, point M lies on the line of centres of the circles.