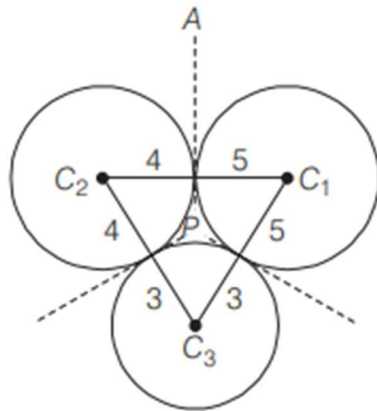


Question: -

Circle with radii 3, 4 and 5 touch each other externally, if P is the point of intersection of tangents to these circles at their points of contact. Find the distance of P from the point of contact. (2005, 2M)

Solution: -

Since, the circles with radii 3, 4 and 5 touch each other externally and P is the point of intersection of tangents.



$\Rightarrow P$ is incentre of $\Delta C_1 C_2 C_3$.

Thus, distance of point P from the points of contact

= inradius (r) of $\Delta C_1 C_2 C_3$

i.e.
$$r = \frac{\Delta}{s} = \sqrt{\frac{s(s-a)(s-b)(s-c)}{s}}$$

where, $2s = 7 + 8 + 9 \Rightarrow s = 12$

Hence,
$$r = \sqrt{\frac{(12-7)(12-8)(12-9)}{12}} = \sqrt{\frac{5 \cdot 4 \cdot 3}{12}} = \sqrt{5}$$