Comprehension # 1 (Q. No. 1 to 3)

Let S_1, S_2, S_3 be the circles $x^2 + y^2 + 3x + 2y + 1 = 0$, $x^2 + y^2 - x + 6y + 5 = 0$ and $x^2 + y^2 + 5x - 8y + 15 = 0$, then

1. Point from which length of tangents to these three circles is same is **[15JM110364]**
(A) (1, 0) (B) (3, 2) (C) (10, 5) (D) (– 2, 1)

2. Equation of circle S_4 which cut orthogonally to all given circle is **[15JM110365]**
(A) $x^2 + y^2 - 6x + 4y - 14 = 0$
(B) $x^2 + y_2 + 6x + 4y - 14 = 0$
(C) $x^2 + y^2 - 6x - 4y + 14 = 0$
(D) $x^2 + y^2 - 6x - 4y - 14 = 0$

3. Radical centre of circles S_1, S_2, & S_4 is **[15JM110366]**
(A) $\left(-\frac{3}{5}, -\frac{8}{5}\right)$ (B) (3, 2) (C) (1, 0) (D) $\left(-\frac{4}{5}, -\frac{3}{2}\right)$

Comprehension # 2 (Q. No. 4 to 5)

Two circles are $S_1 \equiv (x+3)^2 + y^2 = 9$; $S_2 \equiv (x-5)^2 + y^2 = 16$ with centres C_1 & C_2

4. A direct common tangent is drawn from a point P which touches S_1 & S_2 at Q & R, respectively. Find the ratio of area of ΔPQC_1 & ΔPRC_2. **[16JM110533]**

(A) 3 : 4 (B) 9 : 16 (C) 16 : 9 (D) 4 : 3

5. From point 'A' on S_2 which is nearest to C_1, a variable chord is drawn to S_1. The locus of mid point of the chord. **[16JM110534]**

(A) circle (B) Diameter of s_1 (C) Arc of a circle (D) chord of s_1 but not diameter

6. Locus of 5 cuts the circle S_1 at B & C, then line segment BC subtends an angle on the major arc of circle S_1 is **[16JM110535]**

(A) $\cos^{-1}\frac{3}{4}$ (B) $\frac{\pi}{2} - \tan^{-1}\frac{4}{3}$ (C) $\frac{\pi}{2} - \frac{1}{2}\tan^{-1}\frac{3}{4}$ (D) $\frac{\pi}{2}\cot^{-1}\frac{4}{3}$