Lecture related problems with solutions

Q1) Find the length of the tangent from $(12,-9)$ to the circle

$$3x^2+3y^2-7x+22y+9=0$$

Ans) Dividing the equation of the circle by **3**, we get the standard form

$$X^2+y^2-7/3x+22/3y+3=0$$

The required length of the tangent from (12,–9) is

(12^2+(-9)^2-7/3(12)+22/3(-9) +3)^1/2= (134)^1/2.

Q2) The tangent to circle x^2+y^2=5 at (1,-2) also touches the circle x^2+y^2-8x+6y+20=0

Find the coordinates of the corresponding point of contact.

Ans) equation of tangent from (1,-2) to x^2+y^2=5 is x-2y-5=0.

Now putting x=2y+5 in second circle we get y^2+2y+1=0 , y=-1,x=3.

Thus, the point of contact is (3,-1).

Q3) Find the angle between the two tangents from the origin to the circle

(x-7)^2 + (y+1)^2=25.

Ans) Any line through (0, 0) be y-mx=0 and it's a tangent to circle (x-7)^2 + (y+1)^2=25

If |-1-7m|/(1+m^2)^1/2 =5 $\Rightarrow m=3/4,-4/3$.

The product of both is -1 so they are perpendicular to each other

Hence, the angle between the two tangents is pi/2.

Q4) Find the equation of normal to the circle 2x^2+2y^2-2x-5y+3=0 at (1,1)

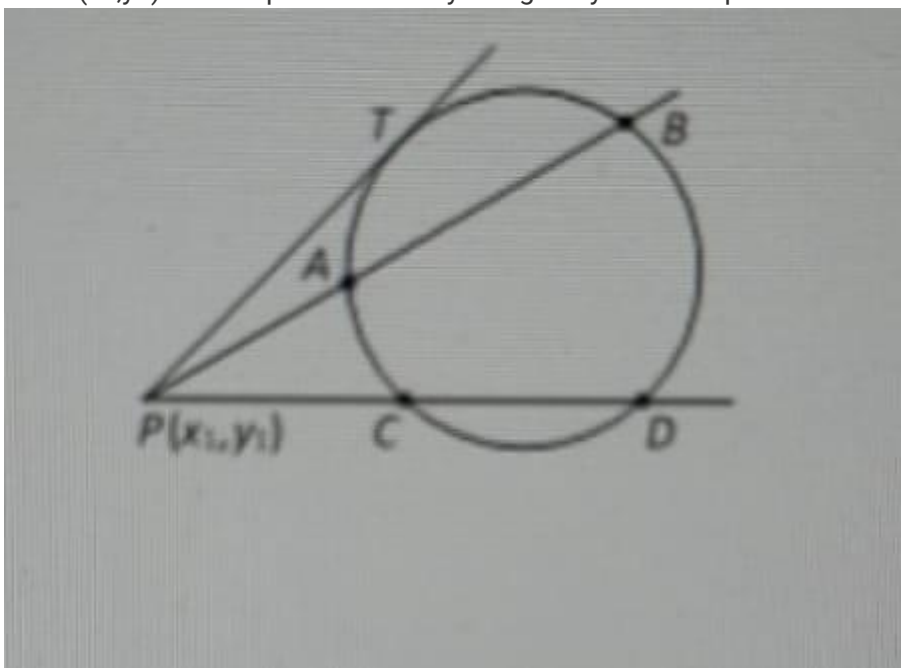
Ans) By solving we get the centre of the circle is (1/2,5/4)

Normal to circle at point (1,1) is line passing through the points (1,1) and (1/2,5/4)

Which is x+2y=3.

Q5) Let P(x1,y1) be a point outside the circle *PAB* and *PCD* drawn two secants. The power of

P(x1,y1) with respect to s=x^2+y^2+2gx+2fy+c=0 is equal to PA.PB which is



Ans) $x_1^2+y_1^2+2gx_1+2fy_1+c=S_1$

$\therefore PA.PB=(s1)=$ **Square of the length of tangent.**