

Worksheet 7-Paper 2

Q.1 $(3, k)$ is $2\sqrt{5}$ units from the line $L: x - 2y + 1 = 0$. Find 2 values of k .

Q2. Find the obtuse angle between the lines $2x + y + 5 = 0$ and $3x - 4y + 1 = 0$.

Q3. Find the slopes of the 2 lines that pass through the point $(6, 1)$ and make an angle of $\tan^{-1}(1)$ with the line $x + 2y = 0$.

Q4. Show that for all values of $t \in \mathbb{R}$, $\left(\frac{2t}{1+t^2}, \frac{1-t^2}{1+t^2}\right)$ lies on the circle $x^2 + y^2 = 1$

Q5. Find the values of k for which $x - y + k = 0$ is a tangent to

$$(x - 3)^2 + (y + 4)^2 = 50, k \in \mathbb{R}.$$

Q6.

- (i) $(5, 2)$ is on the circle $x^2 + y^2 + px - 2y + 5 = 0$. Find p .
- (ii) Find the points of intersection of this circle and the line $x - y - 1 = 0$

Q7. S_1 and S_2 touch externally. Centre of S_1 is $(13, 3)$. Equation of S_2 is

$$x^2 + y^2 - 2x + 4y = 11$$

Find

- (i) the equation of S_1
- (ii) the equation of the common tangent

Q8. Find the equations of the two tangents from the point $(6, -4)$ to the circle

$$x^2 + y^2 - 6x + 10y + 26 = 0.$$

Q9. The y-axis is a tangent to the circle $x^2 + y^2 + 2gx + 2fy + c = 0$. Prove that $f^2 = c$.

Q10. Find the equations of the two circles that pass through $(-3, 6)$ and $(-6, 3)$ and have the y-axis as a tangent.

Q11. Write down the equation of the circle with centre $(-3, 2)$ and radius 4.

Q12. A circle has equation $x^2 + y^2 - 2x + 4y - 15 = 0$. Find the values of m for which the line $mx + 2y - 7 = 0$ is a tangent to the circle.

Q13.

- a) The centre of a circle lies on the line $x - 2y - 1 = 0$. The x-axis and the line $y=6$ are tangents to the circle. Find the equation of this circle.
- b) Another circle has equation $x^2 + y^2 - 6x - 12y + 41 = 0$. Show that these two circles touch externally.

Q14.

- a) A circle with centre $(3, -4)$ passes through $(7, -3)$. Find the equation of the circle.
- b) $3x + 4y + k = 0$ is a tangent to $x^2 + y^2 - 8x - 10y + 32 = 0$. Find two possible values of k .
- c) $y = 2x$ is a tangent to a circle at the point $(2, 4)$. The circle also passes through $(4, -2)$. Find the equation of the circle.

Q15.

- (i) Divide the line segment $[ab]$ in the ratio 3:5.

a $(16, -8)$ b $(-24, 24)$

- (ii) $(3, 7)$ is mapped onto $(-1, 3)$ by an axial symmetry in the line L. Find the equation of L.