CLASS XII
SAMPLE PAPER
MATHS

TANGENTS AND NORMAL

1. Find the equation of the tangent and the normal to the curve $y= x^4-6x^3+13x^2-10x+5$ at the point (1,3)
2. Find the equation of the tangent and the normal to the curve $y= x^2+4x+1$ when x=3.
3. Show that the equation of the tangent to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ at (x_1,y_1) is $\frac{xx_1}{a^2}+\frac{yy_1}{b^2}=1$.
4. Find the equation of the tangent to the curve $y=\sqrt{5x-3}-2$ which is parallel to the lines 4x-2y+3=0.
5. Find the equation of the normals to the curve $3x^2-y^2=8$, parallel to the line x+3y=4.
6. Prove that the curve $\left(\frac{x}{a}\right)^n+\left(\frac{y}{b}\right)^n=2$ touches the straight line $\frac{x}{a}+\frac{y}{b}=2$ at the point (a,b) ,whatever be the value n.
7. Find the coordinates of the points at which the tangent to the curve $3b^2y=x^3-3ax^2$ is parallel to the x-axis.
8. Prove that all points of the curve $y^2=4a\left[x+a\sin\frac{x}{a}\right]$ at which the tangent is parallel to the axis of x , lie on a parabola.
9. Tangent are drawn from the origin to the curve y=sinx . Prove that their points of contact lie on the curve $x^2y^2=(x^2-y^2)$.
10. Determine the points on the curve $2y=(3-x^2)$ at which the tangent is parallel to the line x+y=0.
11. Find the points on the curve $4x^2+9y^2=1$, where the tangents are perpendiculars to the line 2y+x=0.
12. Find the coordinates of the points on the curve $y=x^2+3x+4$, the tangents at which pass through the origin.

13. If the straight line $x\cos\alpha + y\sin\alpha = p$ *touches* the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, prove that $p^2=a^2\cos^2\alpha+B^2\sin^2\alpha$.

14. If the straight line $x\cos\alpha + y\sin\alpha = p$ *touches the curve* $x^m y^n = a^{m+n}$; *prove that :* $p^{m+n}m^m n^n = (m+n)^{m+n}\cos^m\alpha\sin^n\alpha$

15. Find the equation of the normal to the curve $y=2\sin^2 3x$ at $x = \frac{\pi}{6}$.

16. Find the equations of the tangent and the normal to the curve $y(x-2)(x-3)-x+7=0$ at the points where it cuts the x-axis .

17. Show that $\frac{x}{a} + \frac{y}{b} = 1$ touches the curve $y=be^{-x/a}$ at the point where the curve crosses the axis of y.

18. Find the equations of the tangent and the normal at the point 't' on the curve $x=a\sin^3 t$, $y=b\cos^3 t$.

By:-Prateek Gupta
Mob No. 9716183835