sns academy

a fingerprint school

Sincerity, Nobility and Service

Class: XII APPLICATIONS OF DERIVATIVES

1. Air is being pumped into a spherical balloon so that its volume is increasing at a rate of 100c.c/s. how fast is the radius of the balloon increasing when the diameter is 50 cm. (Ans: $\frac{1}{25\pi}$)
2. A water tank is the shape of an invented cone with base radius 2 m and height 4 m. if water is being pumped into the tank at a rate of $2m^3/\min$, find the rate at which the water level is rising when the water is 3m deep. (Ans: $\frac{8}{9\pi}$)
3. Find the equations of the tangent and normal at $\theta = \frac{\pi}{2}$ to the curve $x = a(\theta + \sin\theta), y = a(1 + \cos\theta)$.
4. Find the equation of the tangent to the parabola, $y^2 = 20x$, which forms an angle 45^0 with the x-axis.
5. Find the equations of the normal to $y = x^3 - 3x$ that is parallel to 2x+18y=9.
6. Show that the equation of the normal to the curve $x = a\cos^3\theta, y = a\sin^3\theta$ at θ is $x\cos\theta - y\sin\theta = a\cos 2\theta$.
7. Determine for which values of 'x' the function $f(x) = 2x^3 - 15x^2 + 36x + 1$ is increasing and for which it is decreasing. Also determine the points where the tangents to the graph of the function are parallel to x-axis.
8. Find the intervals of which f is increasing or decreasing.

   $f(x) = x - 2\sin x, [0, 2\pi]$.
9. The edge of a cube was found to be 30 cm with a possible error in measurement of 0.1 cm. use differentials to estimate the maximum possible error in computing (i) the volume of the cube (ii) surface area
10. Find the approximate values of (i) $\frac{1}{10.1}, (ii)(1.97)^6$