



## MATHEMATICS CH- 6- APPLICATION OF DERIVATIVES

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Class: XII Sec: \_\_\_\_

- 1.If the rate of change of volume of a sphere is equal to the rate of change of its radius, find the radius of the sphere.
- 2.The surface area of a spherical bubble is increasing at the rate of  $2\text{cm}^2/\text{s}$ . Find the rate at which the volume of the bubble is increasing at the instant if its radius is 6 cm.
- 3.Find the intervals in which the function  $f(x) = \frac{3}{2}x^4 - 4x^3 - 45x^2 + 51$  is strictly increasing and decreasing.
- 4.Prove that the curves  $x = y^2$  and  $xy = k$  cut at right angles if  $8k^2 = 1$ .
- 5.Find the point on the curve  $y = x^3 - 11x + 5$  at which the equation of tangent is  $y = x - 11$ .
- 6.Find the approximate value of  $f(3.02)$ , where  $f(x) = 3x^2 + 5x + 3$ .
- 7.Using differentials, find the approximate value of  $\sqrt{49.5}$
- 8.Find the points on the curve  $y = x^3$  at which the slope of the tangent is equal to the y- coordinate of the point.
- 9.Find the equations of the normals to the curve  $y = x^3 + 2x + 6$  which are parallel to the line  $x + 14y + 4 = 0$ .
- 10.Of all the closed right circular cylindrical cans of volume  $128\pi\text{cm}^3$ , find the dimensions of the can which has minimum surface area.
- 11.The sum of hypotenuse and a side of a right angled triangle is given, show that the area of the triangle is maximum when the angle between them is  $\pi/3$ .
- 12.An open box with a square base is to be made out of a given quantity of cardboard of area  $c^2$  square units. Show that the maximum volume of the box is  $c^3/6\sqrt{3}$  cubic units.