



MATHEMATICS
CH: 6 – APPLICATION OF DERIVATIVES- REVISION WORKSHEET

Name: _____

Date: _____

Class: XII Sec: A

1. Find a point on the curve $y = x^2$, where the rate of change of x – coordinate is twice the rate of change of y – coordinate.
2. A ladder 5 m long is leaning against a wall. The bottom of the ladder is pulled along the ground away from the wall at the rate of 2 cm/s. How fast is the height on the wall decreasing when the foot of the ladder is 4 m away from the wall ?
3. Sand is pouring from a pipe at the rate of 16 cc/s. The falling sand forms a cone on the ground in such a way that the height of the cone is always one-sixth of the radius of the base. How fast is the height of the sand increasing when the height is 6 cm ?
4. The total cost of production is given by cost function $C(x) = 0.2x^3 + x^2 + 3x - 1$. Find the Marginal cost when x is 5 units.
5. The Revenue function is given as $R(x) = x^4 - 5x + 8$. Find the Marginal Revenue when x is 2 units.
6. Find the intervals in which the function $\frac{3}{2}x^4 - 4x^3 - 45x^2 + 51$ is
(i) strictly increasing (ii) strictly decreasing.
7. Find the intervals in which $f(x) = \sin x + \cos x$ is (i) increasing or (ii) decreasing where $0 \leq x \leq 2\pi$.
8. A square sheet of side 18 m is to be converted into an open box. What is the side of the square to be cut on each corner of the sheet to get maximum volume of the box ?
9. A wire is of length 28 m is to be cut into two pieces. One is to be converted into a square and the other into a circle. Find the size of each piece so as to get the combined area of square and circle is minimum ?
10. A window is in the shape of a rectangle surmounted by a semi circle. The total perimeter of the window is 10 m. Find the dimensions of the window so as to admit maximum air inside the room.
11. An open tank with a square base and vertical sides is to be constructed from a metal sheet so as to hold a maximum quantity of water. Show that the cost is minimum when the depth of the tank is half of width.



INDIAN SCHOOL NIZWA

12. A helicopter is flying along the curve $y = x^2 + 7$. A soldier placed at $(3, 7)$ wants to shoot down the helicopter when it is nearest to him. Find the nearest distance.

13. The lengths of sides of an isosceles triangle are $9 + x^2$, $9 + x^2$ and $18 - 2x^2$. Calculate the area of triangle in terms of x and find the value of x which makes the area maximum.

14. Find the absolute maximum and minimum values of the function $f(x) = 12x^{4/3} - 6x^{1/3}$ in $[-1, 1]$

15. Find the intervals in which $f(x) = \sin x - \cos x$ is (i) increasing or (ii) decreasing where

$$0 \leq x \leq 2\pi.$$