

**INDIAN SCHOOL DARSAIT****Class XII****Mathematics Worksheet****Worksheet # 17 Application of Derivatives # 6****Maxima & Minima # 2****(Chapter – 6 : Application of Derivatives)****CLASS WORK**

1. A tank with rectangular base and rectangular sides, open at the top is to be constructed so that its depth is 2 m and volume is 8 m<sup>3</sup>. If building of tank costs Rs 70 per sq. metres for the base and Rs 45 per square metre for sides. What is the cost of least expensive tank?
2. The sum of the perimeter of a circle and square is k, where k is some constant. Prove that the sum of their areas is least when the side of square is double the radius of the circle.
3. If length of three sides of a trapezium other than base are equal to 10cm, then find the area of the trapezium when it is maximum.
4. A point on the hypotenuse of a right triangle is at a distance a and b from the sides of the triangle. Show that the minimum length of the hypotenuse is
5. Find the point on the curve  $y^2 = 2x$  which is at a minimum distance from the point (1, 2).
6. Find the absolute maximum value and the absolute minimum value of the following functions in the given intervals:
  - i)  $f(x) = \sin x + \cos x$ ,  $x \in [0, \pi]$
  - ii)  $f(x) = 3x^4 - 8x^3 + 12x^2 - 48x + 25$  on the interval  $[0, 3]$
7. Find the maximum value of  $2x^3 - 24x + 107$  in the interval  $[1, 3]$ . Find the maximum value of the same function in  $[-3, -1]$ .

**HOME WORK**

8. Find the absolute maximum and minimum values of the function f given by  $f(x) = \cos 2x + \sin x$ ,  $x \in [0, \pi]$
9. It is given that at  $x = 1$ , the function  $x^4 - 62x^2 + ax + 9$  attains its maximum value, on the interval  $[0, 2]$ . Find the value of a.
10. Find the point on the curve  $y^2 = 4x$  which is nearest to the point (2, 1).
11. The sum of the areas of a rectangular parallelepiped with sides  $x$ ,  $2x$ ,  $\frac{x}{3}$  and a sphere of radius r is constant. Prove that the sum of their volumes is minimum if x is equal to three times the radius of the sphere. Also find the minimum volume.