**ALVA’S P.U. COLLEGE, MOODBIDRI.**

**CET CRASH COURSE [MATHS] – 2020**

**TOPIC : APPLICATION OF DERIVATIVES**

1. In a right angled triangle ABC , area is maximum, then sinA+sinB+sinC =
2. +1 b) -1 c) 2 d) 2
3. The equation of the tangent to the curve on it is , then is

a) b) c) d)

1. If f is a real valued differentiable function for all x and f(1)=-2, 2 for x[1,6] then

f(6)<8 bf(6) 8 cf(6)=5 d f(6)<5

1. If the function f(x) = +kx+7 is increasing in the interval [-2,2] then k is
2. >4 b) <4 c)<-6 d) >6
3. The tangent and the normal drawn to the curve cuts the x – axis at A and B respectively then the area of the triangle PAB in square units is

a) b) c) d) 4

1. If is increasing then

a) b) c) d)

1. The surface area of a ball is increasing at the rate of sq cm/sec. The rate at which the radius is increasing when the surface area is sq cm is (in cm/sec)

a) b) c) d)

1. The hypotenuse of a right angled triangle is k cm, the area is maximum, then the sides

of the triangle are

1. k,k b) k, k c) , d) ,
2. A rod of length 13 meters has one end P on the X – axis and other end Q on the Y – axis. If P moves along the X – axis with a speed of 12 m/sec, then the speed of the other end Q when it is 12 meters from the origin is

a) b) c) d)

1. The maximum slope of the curve is

b) c) d)

1. The minimum value of is

a) b) c) d)

1. A circular sector of perimeter 60mts with maximum area is to be constructed. The radius of the circular arc in metres must be

a) b) c) d)

1. If has its extremum value at is equal to

a) b) c) d)

1. The shortest distance from the point (1,0) to the curve is

a) b) c) d)

1. The distance of that point on the curve which is closest to the straight line is

a) b) c) d)

1. The rate of change of the diagonal of a square of area A and side x w.r.to its area is

b) c) d)

1. A value of c for which the conclusion of MVT holds for the function f(x)= in

the interval [1,3] is

1. b) c) d)
2. The function is decreasing in the interval

a) b) c) d)

1. Let then a number c of the Lagrange’s mean value theorem is

a) b) c) d) none of these

1. The minimum value of is

a) 1 b) c) d)

1. There is an error of 0.5sqcm in the calculation of the surface area of a sphere, then the

error in the calculation of its volume when its radius is 10cms is

1. 0.25 b) 2.5 c) 5.0 d) 1.0
2. The curve has a vertical tangent at the point

a) b)at no point c) d)

1. The medians of an equilateral triangle are increasing at the rate of . What is

the rate at which its sides are increasing?

1. b) c) d)
2. A point on the curve , where the normal is parallel to the line is

a) b) c) d)

1. A rectangle has three of its vertices on the coordinate axes and fourth on the curve . Then the maximum area of the rectangle is (in sq units)

a) b) c) d)

1. The maximum height reached by the body projected upwards which moves according

to the law s= ut - a ,where s is in metres,t in seconds, from the ground is (in mts) is

a) b) c) d)

1. The absolute maximum of the function

is

a) b) c) d)

1. An isosceles triangle of vertical angle is inscribed in a circle of radius a . The area of the triangle is maximum, if

b) c) d)

1. A quadratic function in x has the value 19 when and has maximum value 20 when . Then the function is

a) b) c) d)

1. If , then the minimum value of is

a) b) c) d)

1. The set of real values of x for which is increasing is

a) b) c) d)

1. P is the point of contact of the tangent from the origin to the curve . The length of the perpendicular drawn from the origin to the normal at P is

a) b) c) d)

1. If then its maximum value is

b) c) d)

1. The smallest value of the polynomial is

a) b) c) d)

1. The point of extremum of the function are

a) b) c) d)

1. If then the minimum value of is

a) b) c) d)

1. The number of points in the tangents at which to the curve are perpendicular to the Y – axis is

a) b) c) d)

1. If the line is a tangent to the curve then

a)2 b)5 c) 1 d) 4

1. The equation of the normal to the curve where the curve crosses x – axis is

b)

c) d)

1. If the line touches the rectangular hyperbola then

a) b) c) d)

1. If the slope of the tangent to the curve is equal to the ordinate of P, then the coordinate of P are

a) b) c) d)

1. The tangent of any point on the hyperbola and the coordinate axes makes a triangle of area (in sq units)

b) c) d)

1. If is increasing for all real values of x, then

a) b) c) d)

1. The tangent to the curve at any point is inclined at an acute angle with the positive direction of x – axis. Then ‘a’ can take any value in the interval.

b) c) d)

1. The area of the triangle formed by the tangent to the curve and the coordinate axes is

a) b) c) d)6ab

1. If is a tangent to the rectangular hyperbola then

a) b)

c) d)

1. A light is hung 6 meters vertically above, a man is walking away from the light at the rate of . If the height of the man is 2 mts, then the rate at which the shadow increases is

a) b) c) d)

1. The area of an equilateral triangle of side ‘a’ feet is increasing at the rate of . the rate at which the perimeter is increasing is

b) c) d)

1. The equation of the horizontal tangent to the curve is

a) b) c) d)

1. The denominator of a fraction is greater than 16 of the square of numerator then least value of fraction is

a) b) c) d)

1. If the tangent to the curve at the point cuts off intercepts on the coordinate axes where then the value of ‘a’ is equal to

b) c) d)

1. The approximate value of is (given )

a) b) c) d)

1. How much does the side of a square change if its area increases from 9 to 9.1 sq mts?

a) b) c) d)

1. The maximum value of is

b) c) d)

1. Let x be a number which exceeds its square by the greatest possible quantity , then

a) b) c) d)

1. The function has a local minimum at , then the value of

b) c) d)

1. A ladder 5 mts long standing on a horizontal floor, leans against a vertical wall. If the top of the ladder slides down wards at the rate of 10 cm/sec then the rate at which the angle between the floor and the ladder is decreasing when lower end of the ladder is 2 mts from the wall is (in radian/sec)

a) b) c) d)

1. The point on the curve where the tangent is parallel to the chord joining (3,0) and (4,1) is

b) c) d)

1. For the curve the tangent line is perpendicular to x – axis when

b) c) d)

1. The function satisfies all the conditions of Rolle’s theorem in then the value of c is

a) b) c) d)

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**TOPIC : APPLICATION OF DERIVATIVES**

**Solutions :**

1. In a right angled triangle area is maximum it it is isosceles. Let angles are

GE = 1++ . Ans (a)

1. Ans : (b)

Since (2,3) lies on the curve,

1. Ans : (b) . Apply MVT for f(x) in [1,6] . =(c) ,1<c<6 ==> f(6)+2=5(c)10
2. (x) =2x+k >0 ==> k>-2x in [-2,2] ,==> k>4 (put x=-2) . Ans(a)
3. Ans : (a)

Equation of tangent at is :

Equation of normal at (1,4) is :

; Area of

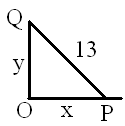
1. Ans : (a)

1. Ans : (a)

1. Area of a right angled triangle is maximum when it is isosceles. Given hypotenuse is k. verfy the options

Ans(d)

1. Ans : (c)



Where

1. Ans : (b)

is a point of maximum for

maximum slope

1. Ans : (a)

Minimum value of is

Minimum value of given expression is

1. Ans : (b)

Area is maximum when

1. Ans : (d)

-----(1)

----(2)

1. Ans : (b)

be any point on the curve

Let . Let

Since , if d is minimum, is also minimum

Let

1. Ans : (b)

Perpendicular distance from to the line

1. Ans : (b)

Diagonal

1. =(c) ==> = . Ans (c)
2. Ans : (a)

1. Ans : (a)

By data such that

1. Wkt maximum of 4sinx+3cosx+2 = +2 =7 . Minimum of given function = =1 .Ans(a)
2. dV =4 dr ; dS =8r dr. ==> = ===>dV = 2.5. Ans(b)
3. Ans : (d)

Tangent is vertical

1. Ans : (a)

In an equilateral triangle , median = altitude

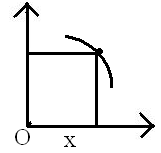
i.e median = h ;

1. Ans : (a)

slope of normal

Slope of given line

Point is

1. Ans : (d)

Let be the fourth vertex,

Area ,

If area is maximum then

Maximum area

1. S= ut-, =0 ==> t= ; = . Ans( d)
2. Ans : (b)

is increasing and hence maximum of is

1. Ans : (c)

Maximum isosceles triangle is equilateral

1. Ans : (a)

Let

----(1)

----(2)

----(3)

Solving the equation we get

1. Ans : (c)

1. Ans : (a)

For increasing function,

1. Ans : (d)

Tangent is

(0,0) lies on it point is (e,1)

Slope of normal

Equation of normal is

Perpendicular distance from (0,0) to normal

1. Ans : (a)

Let

is maximum when y is minimum

1. Ans : (b)

find

minimum

1. Ans : (b)

1. Ans : (d)

minimum of

Maximum of

Minimum of

1. Ans : (d)

tangent is perpendicular to y – axis

1. Ans : (b)

slope of

lies on the curve

1. Ans : (b)

Curve crosses y – axis at (1,0)

normal at (1,0) is

1. Ans : (b)

Slope of

Substitute in equation of line to get

1. Ans : (d)

1. Ans : (d)

Equation of tangent at is

Area

1. Ans : (d)

1. Ans : (d)

Since is acute,

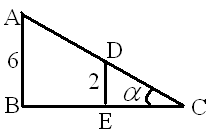
1. Ans : (b)

is tangent to

Area of

1. Ans : (b)

Slope of tangent

1. Ans : (b)

1. Ans : (b)

𝑡 ngent to int for f(x) and g(x) but not for h(x) []between the floor and the ladder is decreasing when lower end of the lad

Perimeter

1. Ans : (c)

for horizontal tangent

1. Ans : (b)

1. Ans : (c)

Differentiate w.r.to and put we get

Equation of tangent at (a,a) is

This cuts x – axis at A and y – axis at B

1. Ans : (c)

Let

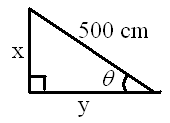
1. Ans : (b)

1. Ans : (c)

Differentiate w.r.to x to get

1. Ans : (a)

1. Ans : (b)

1. Ans :(b)

, differentiate w.r.to

1. Ans : (d)

slope of

1. Ans : (a)

1. Ans : (c)

By data such that

**Answer Key :**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1) a | 2) b | 3) b | 4) a | 5) a | 6) a | 7) a | 8) 1d | 9)c | 10) b |
| 11)a | 12) b | 13) d | 14) b | 15) b | 16) b | 17) c | 18)a | 19) a | 20)a |
| 21)b | 22) d | 23) a | 24)a | 25)d | 26) d | 27) b | 28) c | 29) a | 30)c |
| 31)a | 32) d | 33) a | 34) b | 35) b | 36) d | 37) d | 38) b | 39) b | 40) b |
| 41)d | 42) d | 43) d | 44) d | 45) b | 46) b | 47) b | 48)b | 49) c | 50) b |
| 51)c | 52) c | 53) b | 54) c | 55) a | 56)b | 57) b | 58)d | 59) a | 60)c |