EXERCISE 6.1 - Question No. 1

Find the rate of change of the area of a circle with respect to its radius r when (a) (b)

EXERCISE 6.1 - Question No. 2

The volume of a cube is increasing at the rate of . How fast is the surface area increasing when the length of an edge is 12 cm?

EXERCISE 6.1 - Question No. 3

The radius of a circle is increasing uniformly at the rate of 3 cm/s. Find the rate at which the area of the circle is increasing when the radius is 10 cm.

EXERCISE 6.1 - Question No. 4

An edge of a variable cube is increasing at the rate of 3 cm/s. How fast is the volume of the cube increasing when the edge is 10 cm long?

EXERCISE 6.1 - Question No. 5

A stone is dropped into a quiet lake and waves move in circles at the speed of 5 cm/s. At the instant when the radius of the circular wave is 8 cm, how fast is the enclosed area increasing?

EXERCISE 6.1 - Question No. 6

The radius of a circle is increasing at the rate of 0.7 cm/s. What is the rate of increase of its circumference?

EXERCISE 6.1 - Question No. 7

The length x of a rectangle is decreasing at the rate of 5 cm/minute and the width y is increasing at the rate of 4 cm/minute. When x = 8cm and y = 6cm, find the rates of change of (a) the perimeter, and (b) the area of the rectangle

EXERCISE 6.1 - Question No. 8

A balloon, which always remains spherical on inflation, is being inflated by pumping in 900 cubic centimetres of gas per second.

Find the rate at which the radius of the balloon increases when the radius is 15 cm.

EXERCISE 6.1 - Question No. 9

A balloon, which always remains spherical, has a variable radius. Find the rate at which its volume is increasing with the radius when the later is 10 cm

EXERCISE 6.1 - Question No. 10

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 2cm/s. How fast is its height on the wall decreasing when the foot of the ladder is 4 m away from the wall ?

EXERCISE 6.1 - Question No. 11

A particle moves along the curve . Find the points on the curve at which the y-coordinate is changing 8 times as fast as the x-coordinate.

EXERCISE 6.1 - Question No. 12

The radius of an air bubble is increasing at the rate of — . At what rate is the volume of the bubble increasing when the radius is 1 cm?

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.1 - Question No. 13

A balloon, which always remains spherical, has a variable diameter — .Find the rate of change of its volume with respect to x.

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.1 - Question No. 14

Sand is pouring from a pipe at the rate of 12 . 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 cone increasing when the height is 4cm.

EXERCISE 6.1 - Question No. 15

The total cost C (x) in Rupees associated with the production of x units of an item is given by

. Find the marginal cost

when 17 units are produced

EXERCISE 6.1 - Question No. 16

The total revenue in Rupees received from the sale of x units of a product is given by . Find the marginal revenue when .

EXERCISE 6.1 - Question No. 17

The rate of change of the area of a circle with respect to its radius r

at cm is (A) (B) (C) (D)

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.1 - Question No. 18

The total revenue in Rupees received from the sale of x units of a

product is given by . The marginal revenue,

when is (A) 116 (B) 96 (C) 90 (D) 126

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.2 - Question No. 1

Show that the function given by is strictly

increasing on R.

EXERCISE 6.2 - Question No. 2

Show that the function given by is strictly increasing on

R.

EXERCISE 6.2 - Question No. 3

Show that the function given by f is (a) strictly increasing in — (b) strictly decreasing in — (c) neither increasing nor decreasing in

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.2 - Question No. 4

Find the intervals in which the function f given by is (a) strictly increasing (b) strictly decreasing

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.2 - Question No. 5

Find the intervals in which the function f given by

is (a) strictly increasing (b) strictly

decreasing

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.2 - Question No. 6

Find the intervals in which the following functions are strictly

increasing or decreasing: (a (b) (c)

(d) (e)

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.2 - Question No. 7

Show that ——— , is an increasing function of x throughout its domain.

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.2 - Question No. 8

Find the values of x for which is an increasing function

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.2 - Question No. 9

Prove that ———————— is an increasing function of in

— .

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.2 - Question No. 10

Prove that the logarithmic function is strictly increasing on .

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.2 - Question No. 11

Prove that the function f given by is neither

strictly increasing nor strictly decreasing on .

EXERCISE 6.2 - Question No. 12

Which of the following functions are strictly decreasing on —

(A) (B) (C) (D)

EXERCISE 6.2 - Question No. 13

On which of the following intervals is the function f given by

strictly decreasing ? (A) (0, 1) (B) —

(C) — (D) None of these

EXERCISE 6.2 - Question No. 14

Find the least value of a such that the function f given by

is strictly increasing on

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.2 - Question No. 15

Let I be any interval disjoint from . Prove that the function f

given by — is strictly increasing on 1.

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.2 - Question No. 16

Prove that the function f given by is

strictly increasing on — and strictly decreasing on — .

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.2 - Question No. 17

Prove that the function f given by is strictly

decreasing on — and strictly increasing on — prove that

the function f given by is strictly decreasing on

— and strictly increasing on — . .

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.2 - Question No. 18

Prove that the function given by is

increasing in R.

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.2 - Question No. 19

The interval in which is increasing is (A) (B) (

2, 0) (C) (D) (0, 2)

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.3 - Question No. 1

Find the slope of the tangent to the curve at .

EXERCISE 6.3 - Question No. 2

Find the slope of the tangent to the curve ——— at

.

EXERCISE 6.3 - Question No. 3

Find the slope of the tangent to curve at the point

whose x-coordinate is 2.

EXERCISE 6.3 - Question No. 4

Find the slope of the tangent to the curve at the point whose x-coordinate is 3.

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.3 - Question No. 5

Find the slope of the normal to the curve at $\frac{}{}$.

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.3 - Question No. 6

Find the slope of the normal to the curve

at — .

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.3 - Question No. 7

Find points at which the tangent to the curve

is parallel to the x-axis.

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.3 - Question No. 8

Find a point on the curve at which the tangent is

parallel to the chord joining the points (2, 0) and (4, 4).

EXERCISE 6.3 - Question No. 9

Find the point on the curve at which the tangent is

.

EXERCISE 6.3 - Question No. 10

Find the equation of all lines having slope that are tangents to the curve ——— .

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.3 - Question No. 11

Find the equation of all lines having slope 2 which are tangents to the curve ———

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.3 - Question No. 12

Find the equations of all lines having slope 0 which are tangent to the curve ———————— .

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.3 - Question No. 13

Find points on the curve —— —— at which the tangents are (i) parallel to x-axis (ii) parallel to y-axis.

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.3 - Question No. 14

Find the equations of the tangent and normal to the given curves at the indicated points: (i) at (ii) at (iii) at (iv) at (v) —

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.3 - Question No. 15

Find the equation of the tangent line to the curve which is (a) parallel to the line (b) perpendicular to the line .

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.3 - Question No. 16

Show that the tangents to the curve at the points where and are parallel.

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.3 - Question No. 17

Find the points on the curve at which the slope of the tangent is equal to the y-coordinate of the point.

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.3 - Question No. 18

For the curve find all the points at which the tangent passes through the origin.

EXERCISE 6.3 - Question No. 19

Find the points on the curve at which the tangents are parallel to the x-axis.

EXERCISE 6.3 - Question No. 20

Find the equation of the normal at the point for the curve .

EXERCISE 6.3 - Question No. 21

Find the equation of the normals to the curve which are parallel to the line .

EXERCISE 6.3 - Question No. 22

Find the equations of the tangent and normal to the parabola

at the point .

EXERCISE 6.3 - Question No. 23

Prove that the curves and cut at right angles* if

.

EXERCISE 6.3 - Question No. 24

Find the equations of the tangent and normal to the hyperbola

— — . at the point

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.3 - Question No. 25

Find the equation of the tangent to the curve _____ which is

parallel to the line .

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.3 - Question No. 26

The slope of the normal to the curve sin x at is

(A) 3 (B) – (C) (D) –

EXERCISE 6.3 - Question No. 27

The line is a tangent to the curve at the point (A)

(B) (C) (D)

EXERCISE 6.4 - Question No. 1

Using differentials, find the approximate value of each of the following up to 3 places of decimal. (i) $\sqrt{}$ (ii) $\sqrt{}$ (iii) $\sqrt{}$ (iv) $\bar{}$ (v) $\bar{}$ (vi) $\bar{}$ (vii) `(26)

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.4 - Question No. 2

Find the approximate value of , where .

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.4 - Question No. 3

Find the approximate value of , where

.

EXERCISE 6.4 - Question No. 4

Find the approximate change in the volume V of a cube of side x metres caused by increasing the side by 1%.

EXERCISE 6.4 - Question No. 5

Find the approximate change in the surface area of a cube of side x metres caused by decreasing the side by 1%.

EXERCISE 6.4 - Question No. 6

If the radius of a sphere is measured as 7 m with an error of 0.02 m, then find the approximate error in calculating its volume.

EXERCISE 6.4 - Question No. 7

If the radius of a sphere is measured as 9 m with an error of 0.03 m, then find the approximate error in calculating its surface area.

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.4 - Question No. 8

If then the approximate value of is

(A) 47.66 (B) 57.66 (C) 67.66 (D) 77.66

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.4 - Question No. 9

The approximate change in the volume of a cube of side x metres caused by increasing the side by 3% is (A) 0.06 (B) 0.6 (C) 0.09 (D) 0.9

EXERCISE 6.5 - Question No. 1

Find the maximum and minimum values, if any, of the following functions given by (i) (ii) (iii) (iv)

EXERCISE 6.5 - Question No. 2

Find the maximum and minimum values, if any, of the following functions given by (i) (ii) (iii)

(iv)

EXERCISE 6.5 - Question No. 3

Find the local maxima and local minima, if any, of the following functions. Find also the local maximum and the local minimum values, as the case may be: (i) (ii) (iii)

(iv)

(v) (vi)

— — (vii) g(x) = 1/x^2 +2 f(x) = x sqrt(1-x) ,

x gt 0`

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.5 - Question No. 4

Prove that the following functions do not have maxima or minima:

(i) (ii) (iii)

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.5 - Question No. 5

Find the absolute maximum value and the absolute minimum value

of the following functions in the given intervals: (i)

(ii) (iii)

— — (iv) `f(x)=(x-1)

EXERCISE 6.5 - Question No. 6

Find the maximum profit that a company can make, if the profit

function is given by

EXERCISE 6.5 - Question No. 7

Find both the maximum value and the minimum value of

on the interval [0, 3].

EXERCISE 6.5 - Question No. 8

At what points in the interval , does the function attain its maximum value?

EXERCISE 6.5 - Question No. 9

What is the maximum value of the function ?

EXERCISE 6.5 - Question No. 10

Find the maximum value of in the interval [1, 3].

Find the maximum value of the same function in

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.5 - Question No. 11

It is given that at , the function attains its

maximum value, on the interval [0, 2]. Find the value of a.

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.5 - Question No. 12

Find the maximum and minimum values of on .

EXERCISE 6.5 - Question No. 13

Find two numbers whose sum is 24 and whose product is as large as possible.

EXERCISE 6.5 - Question No. 14

Find two positive numbers x and y such that and is maximum.

EXERCISE 6.5 - Question No. 15

Find two positive numbers x and y such that their sum is 35 and the product is a maximum.

EXERCISE 6.5 - Question No. 16

Find two positive numbers whose sum is 16 and the sum of whose cubes is minimum.

EXERCISE 6.5 - Question No. 17

A square piece of tin of side 18 cm is to be made into a box without top, by cutting a square from each corner and folding up the flaps to form the box. What should be the side of the square to be cut off so that the volume of the box is the maximum possible?

EXERCISE 6.5 - Question No. 18

A rectangular sheet of tin 45 cm by 24 cm is to be made into a box without top, by cutting off square from each corner and folding up the flaps. What should be the side of the square to be cut off so that the volume of the box is maximum ?

EXERCISE 6.5 - Question No. 19

Show that of all the rectangles inscribed in a given fixed circle, the square has the maximum area.

EXERCISE 6.5 - Question No. 20

Show that the right circular cylinder of given surface and maximum volume is such that its height is equal to the diameter of the base.

EXERCISE 6.5 - Question No. 21

Of all the closed cylindrical cans (right circular), of a given volume of 100 cubic centimetres, find the dimensions of the can which has the minimum surface area?

EXERCISE 6.5 - Question No. 22

A wire of length 28 m is to be cut into two pieces. One of the pieces is to be made into a square and the other into a circle. What should be the length of the two pieces so that the combined area of the square and the circle is minimum?

EXERCISE 6.5 - Question No. 23

Prove that the volume of the largest cone that can be inscribed in a sphere of radius R is — of the volume of the sphere.

EXERCISE 6.5 - Question No. 24

Show that the right circular cone of least curved surface and given volume has an altitude equal to ¯ time the radius of the base.

EXERCISE 6.5 - Question No. 25

Show that the semi-vertical angle of the cone of the maximum volume and of given slant height is $\cos^{-1}\frac{1}{\sqrt{3}}$.

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.5 - Question No. 26

Show that semi-vertical angle of right circular cone of given surface area and maximum volume is $\sin^{-1}\frac{1}{3}$.

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.5 - Question No. 27

The point on the curve which is nearest to the point (0, 5) is (A) – (B) – (C) (0, 0) (D) (2, 2)

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.5 - Question No. 28

For all real values of x, the minimum value of ———— is (A) 0 (B) 1 (C) 3 (D) –

Watch Free Video Solution on Doubtnut Now

EXERCISE 6.5 - Question No. 29

The maximum value of is (A) (B)

(C) 1 (D) 0

Watch Free Video Solution on Doubtnut Now

MISCELLANEOUS EXERCISE - Question No. 2

Show that the function given by has maximum at

.

Watch Free Video Solution on Doubtnut Now

MISCELLANEOUS EXERCISE - Question No. 3

The two equal sides of an isosceles triangle with fixed base b are decreasing at the rate of 3 cm per second. How fast is the area decreasing when the two equal sides are equal to the base ?

MISCELLANEOUS EXERCISE - Question No. 4

Find the equation of the normal to curve which passes through the point (1, 2).

MISCELLANEOUS EXERCISE - Question No. 5

Show that the normal at any point to the curve

is at a constant

distance from the origin.

Watch Free Video Solution on Doubtnut Now

MISCELLANEOUS EXERCISE - Question No. 6

Find the intervals in which the function f given by

———————————— is (i) increasing (ii) decreasing.

Watch Free Video Solution on Doubtnut Now

MISCELLANEOUS EXERCISE - Question No. 7

Find the intervals in which the function f given by

— is (i) increasing (ii) decreasing.

Watch Free Video Solution on Doubtnut Now

MISCELLANEOUS EXERCISE - Question No. 8

Find the maximum area of an isosceles triangle inscribed in the

ellipse — — with its vertex at one end of the major axis.

Watch Free Video Solution on Doubtnut Now

MISCELLANEOUS EXERCISE - Question No. 9

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 . If building of tank costs Rs 70 per sq metres for the base and Rs 45 per square metre for sides. What is the

MISCELLANEOUS EXERCISE - Question No. 10

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.

MISCELLANEOUS EXERCISE - Question No. 11

A window is in the form of a rectangle surmounted by a semicircular opening. The total perimeter of the window is 10 m. Find the dimensions of the window to admit maximum light through the whole opening.

MISCELLANEOUS EXERCISE - Question No. 12

A point on the hypotenuse of a triangle is at distance a and b from the sides of the triangle. Show that the maximum length of the hypotenuse is $(a^{2/3}+b^{2/3})^{3/2}$.

MISCELLANEOUS EXERCISE - Question No. 13

Find the points at which the function f given by

has (i) local maxima (ii) local minima (iii)

point of inflexion

MISCELLANEOUS EXERCISE - Question No. 14

Find the absolute maximum and minimum values of the function f

given by

MISCELLANEOUS EXERCISE - Question No. 15

Show that the altitude of the right circular cone of maximum volume that can be inscribed in a sphere of radius r is — .

MISCELLANEOUS EXERCISE - Question No. 16

Let f be a function defined on [a, b] such that , for all . Then prove that f is an increasing function on (a, b).

MISCELLANEOUS EXERCISE - Question No. 17

Show that the height of the cylinder of maximum volume that can be inscribed in a sphere of radius R is $\frac{2R}{\sqrt{3}}$. Also find the maximum volume.

MISCELLANEOUS EXERCISE - Question No. 18

Show that height of the cylinder of greatest volume which can be inscribed in a right circular cone of height h and semi vertical angle is one-third that of the cone and the greatest volume of cylinder is $\frac{4}{27}\pi h^3 \tan^2\alpha$

MISCELLANEOUS EXERCISE - Question No. 19

A cylindrical tank of radius 10 m is being filled with wheat at the rate of 314 cubic metre per hour. Then the depth of the wheat is increasing at the rate of (A) 1 (B) 0.1 (C) 1.1 (D) 0.5

MISCELLANEOUS EXERCISE - Question No. 20

The slope of the tangent to the curve

at the point is (A) — (B) – (C) – (D) —

MISCELLANEOUS EXERCISE - Question No. 21

The line is a tangent to the curve if the value of m is (A) 1 (B) 2 (C) 3 (D) –

Watch Free Video Solution on Doubtnut Now

MISCELLANEOUS EXERCISE - Question No. 22

The normal at the point (1,1) on the curve is (A)

(B) (C) (D)

Watch Free Video Solution on Doubtnut Now

MISCELLANEOUS EXERCISE - Question No. 23

The normal to the curve passing (1,2) is (A) (B)

(C) (D)

Watch Free Video Solution on Doubtnut Now

MISCELLANEOUS EXERCISE - Question No. 24

The points on the curve , where the normal to the curve

makes equal intercepts with the axes are (A) – (B) ——

(C) – (D) –

Watch Free Video Solution on Doubtnut Now

SOLVED EXAMPLES - Question No. 1

Find the rate of change of the area of a circle per second with respect to its radius r when cm.

SOLVED EXAMPLES - Question No. 2

The volume of a cube is increasing at a rate of 9 cubic centimetres per second. How fast is the surface area increasing when the length of an edge is 10 centimetres?

SOLVED EXAMPLES - Question No. 3

A stone is dropped into a quiet lake and waves move in circles at a speed of 4cm per second. At the instant, when the radius of the circular wave is 10 cm, how fast is the enclosed area increasing?

SOLVED EXAMPLES - Question No. 4

The length x of a rectangle is decreasing at the rate of 3 cm/minute and the width y is increasing at the rate of 2cm/minute. When cm and cm, find the rates of change of (a) the perimeter and (b) the area of the rectangle.

SOLVED EXAMPLES - Question No. 5

The total cost C(x) in Rupees, associated with the production of x units of an item is given by

. Find the marginal cost when 3 units are produced, where by marginal cost we mean the instantaneous rate of change of total cost at any level of output.

SOLVED EXAMPLES - Question No. 6

The total revenue in Rupees received from the sale of x units of a product is given by . Find the marginal

revenue, when , where by marginal revenue we mean the rate of change of total revenue with respect to the nu

SOLVED EXAMPLES - Question No. 7

Show that the function given by is strictly increasing on R.

SOLVED EXAMPLES - Question No. 8

Show that the function f given by is strictly increasing on R.

SOLVED EXAMPLES - Question No. 9

Prove that the function given by is (a) strictly decreasing in (b) strictly increasing in , and (c) neither increasing nor decreasing in

SOLVED EXAMPLES - Question No. 10

Find the intervals in which the function f given by

is (a) strictly increasing (b) strictly decreasing

SOLVED EXAMPLES - Question No. 11

Find the intervals in which the function f given by

is (a) strictly increasing (b) strictly

decreasing

SOLVED EXAMPLES - Question No. 12

Find intervals in which the function given by , x

— is (a) increasing (b) decreasing.

SOLVED EXAMPLES - Question No. 13

Find the intervals in which the function f given by

is strictly increasing or strictly decreasing.

Watch Free Video Solution on Doubtnut Now

SOLVED EXAMPLES - Question No. 14

Find the slope of the tangent to the curve .

Watch Free Video Solution on Doubtnut Now

SOLVED EXAMPLES - Question No. 15

Show that the altitude of a right circular cone of maximum volume that can be inscribed in a sphere of radius r is 4r/3. .

SOLVED EXAMPLES - Question No. 16

Find the equation of all lines having slope 2 and being tangent to the curve ——— .

SOLVED EXAMPLES - Question No. 17

Find points on the curve — — at which the tangents are (i) parallel to x-axis (ii) parallel to y-axis.

SOLVED EXAMPLES - Question No. 18

Find the equation of the tangent to the curve ———————— at the point where it cuts the x-axis.

SOLVED EXAMPLES - Question No. 19

Find the equations of the tangent and normal to the curve

- - at (1, 1)

Watch Free Video Solution on Doubtnut Now

SOLVED EXAMPLES - Question No. 20

Find the equation of tangent to the curve given by

... (1) at a point where — .

Watch Free Video Solution on Doubtnut Now

SOLVED EXAMPLES - Question No. 21

Use differential to approximate ——

SOLVED EXAMPLES - Question No. 22

The line y=mx+1 is a tangent to the curve if the value of m is (A) 1 (B) 2 (C) 3 (D) 1/2 .

SOLVED EXAMPLES - Question No. 23

Find the approximate value of f(3.02), where .

SOLVED EXAMPLES - Question No. 24

Find the approximate change in the volume V of a cube of side x meters caused by increasing the side by 2%.

SOLVED EXAMPLES - Question No. 25

If the radius of a sphere is measured as 9 cm with an error of 0.03 cm, then find the approximate error in calculating its volume.

SOLVED EXAMPLES - Question No. 26

Find the maximum and the minimum values, if any, of the function f given by .

SOLVED EXAMPLES - Question No. 27

Find the maximum and minimum values of f , if any, of the function given by .

SOLVED EXAMPLES - Question No. 28

Find the maximum and the minimum values, if any, of the function

given by

SOLVED EXAMPLES - Question No. 29

Find all points of local maxima and local minima of the function f

given by .

SOLVED EXAMPLES - Question No. 30

Find all the points of local maxima and local minima of the

function f given by

SOLVED EXAMPLES - Question No. 31

Find local minimum value of the function f given by

.

SOLVED EXAMPLES - Question No. 32

Find local maximum and local minimum values of the function f given by .

Watch Free Video Solution on Doubtnut Now

SOLVED EXAMPLES - Question No. 33

Find all the points of local maxima and local minima of the function f given by .

Watch Free Video Solution on Doubtnut Now

SOLVED EXAMPLES - Question No. 34

Find two positive numbers whose sum is 15 and the sum of whose squares is minimum.

SOLVED EXAMPLES - Question No. 35

Find the shortest distance of the point (0, c) from the parabola , where .

SOLVED EXAMPLES - Question No. 36

Let AP and BQ be two vertical poles at points A and B,

respectively. If , then find

the distance of a point R on AB from the point A such that

is minimum.

Watch Free Video Solution on Doubtnut Now

SOLVED EXAMPLES - Question No. 37

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.

Watch Free Video Solution on Doubtnut Now

SOLVED EXAMPLES - Question No. 38

Prove that the radius of the right circular cylinder of greatest curved surface area which can be inscribed in a given cone is half of that of the cone.

SOLVED EXAMPLES - Question No. 39

Find the absolute maximum and minimum values of a function f given by on the interval .

SOLVED EXAMPLES - Question No. 40

Find absolute maximum and minimum values of a function f given by – – .

Watch Free Video Solution on Doubtnut Now

SOLVED EXAMPLES - Question No. 41

An Apache helicopter of enemy is flying along the curve given by . A soldier, placed at (3, 7), wants to shoot down the helicopter when it is nearest to him. Find the nearest distance.

Watch Free Video Solution on Doubtnut Now

SOLVED EXAMPLES - Question No. 42

A car starts from a point P at time t = 0 seconds and stops at point Q. The distance x, in metres, covered by it, in t seconds is given by

— Find the time taken by it to reach Q and also find distance between P and Q.

SOLVED EXAMPLES - Question No. 43

A water tank has the shape of an inverted right circular cone with its axis vertical and vertex lowermost. Its semi-vertical angle is . Water is poured into it at a constant rate of 5 cubic metre per hour. Find the rate at which the level of the water is rising at the instant when the depth of water in the tank is 4m.

SOLVED EXAMPLES - Question No. 44

A man of height 2 metres walks at a uniform speed of 5 km/h away from a lamp post which is 6 metres high. Find the rate at which the length of his shadow increases.

SOLVED EXAMPLES - Question No. 45

Find the equation of the normal to the curve which passes through the point (1, 2).

SOLVED EXAMPLES - Question No. 46

Find the equation of tangents to the curve

that are parallel to the line

.

SOLVED EXAMPLES - Question No. 47

Find intervals in which the function given by

is (a) strictly increasing (b)

strictly decreasing.

SOLVED EXAMPLES - Question No. 48

Show that the function f given by

is always an strictly increasing function in — .

SOLVED EXAMPLES - Question No. 49

A circular disc of radius 3 cm is being heated. Due to expansion, its radius increases at the rate of 0.05 cm/s. Find the rate at which its area is increasing when radius is 3.2 cm.

SOLVED EXAMPLES - Question No. 50

An open topped box is to be constructed by removing equal squares from each corner of a 3 metre by 8 metre rectangular sheet of aluminium and folding up the sides. Find the volume of the largest such box.

SOLVED EXAMPLES - Question No. 51

Manufacturer can sell x items at a price of rupees —— each. The cost price of x items is Rs — . Find the number of items he should sell to earn maximum profit