| Ques No.	Question
1	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 1** Find the rate of change of the area of a circle with respect to its radius r when (a) $r = 3\ cm$ (b) $r = 4\ cm$ ▶ Watch Free Video Solution on Doubtnut
2	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 2** The volume of a cube is increasing at the rate of $8\ cm^3/s$. How fast is the surface area increasing when the length of an edge is 12 cm? ▶ Watch Free Video Solution on Doubtnut
3	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 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. ▶ Watch Free Video Solution on Doubtnut
4	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 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? ▶ Watch Free Video Solution on Doubtnut
5	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 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? ▶ Watch Free Video Solution on Doubtnut
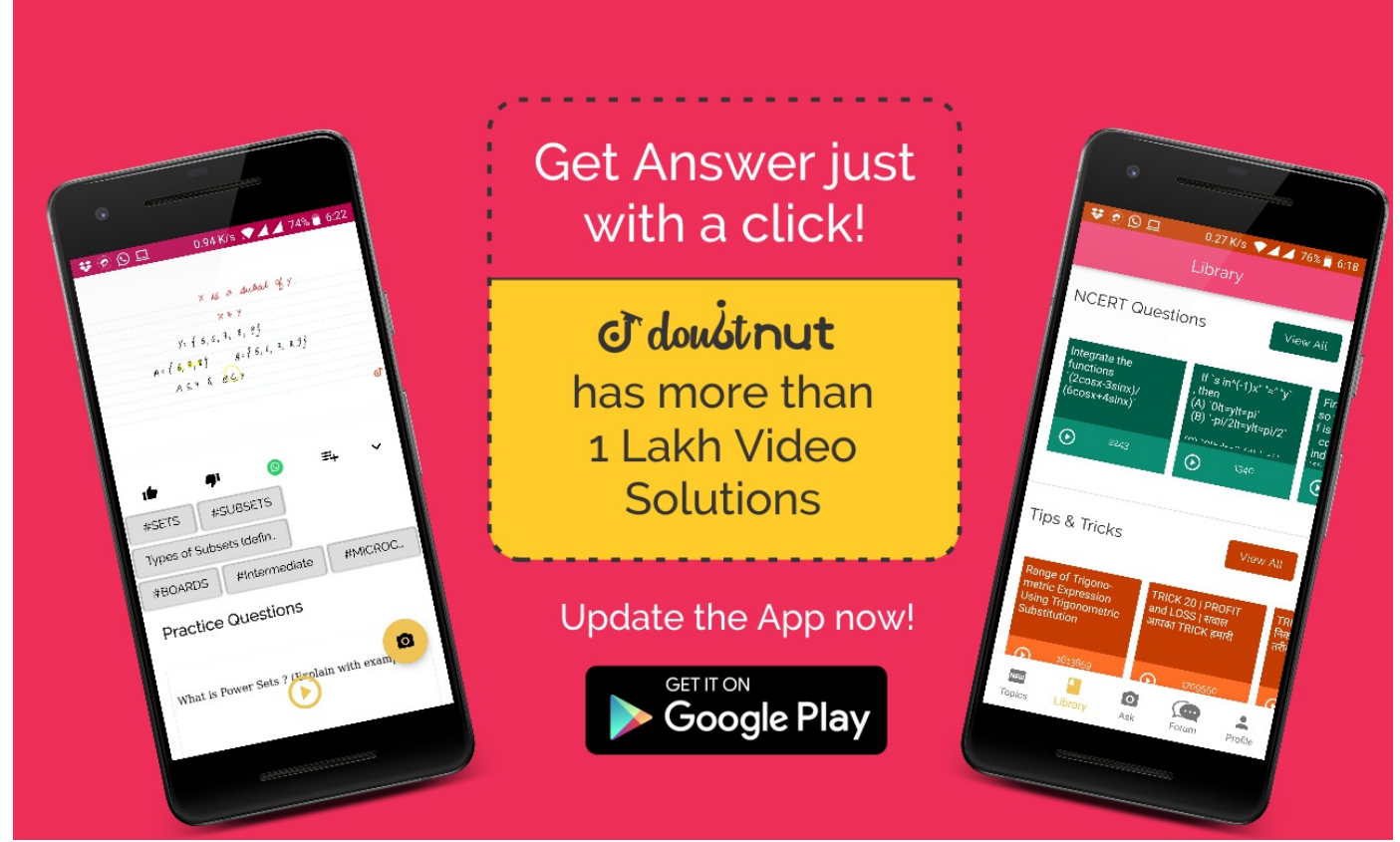
6	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 6** The radius of a circle is increasing at the rate of 0.7 cm/s. What is the rate of increase of its circumference? ▶ Watch Free Video Solution on Doubtnut
7	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 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 ▶ Watch Free Video Solution on Doubtnut
8	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 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. ▶ Watch Free Video Solution on Doubtnut
9	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 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 ▶ Watch Free Video Solution on Doubtnut
10	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 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

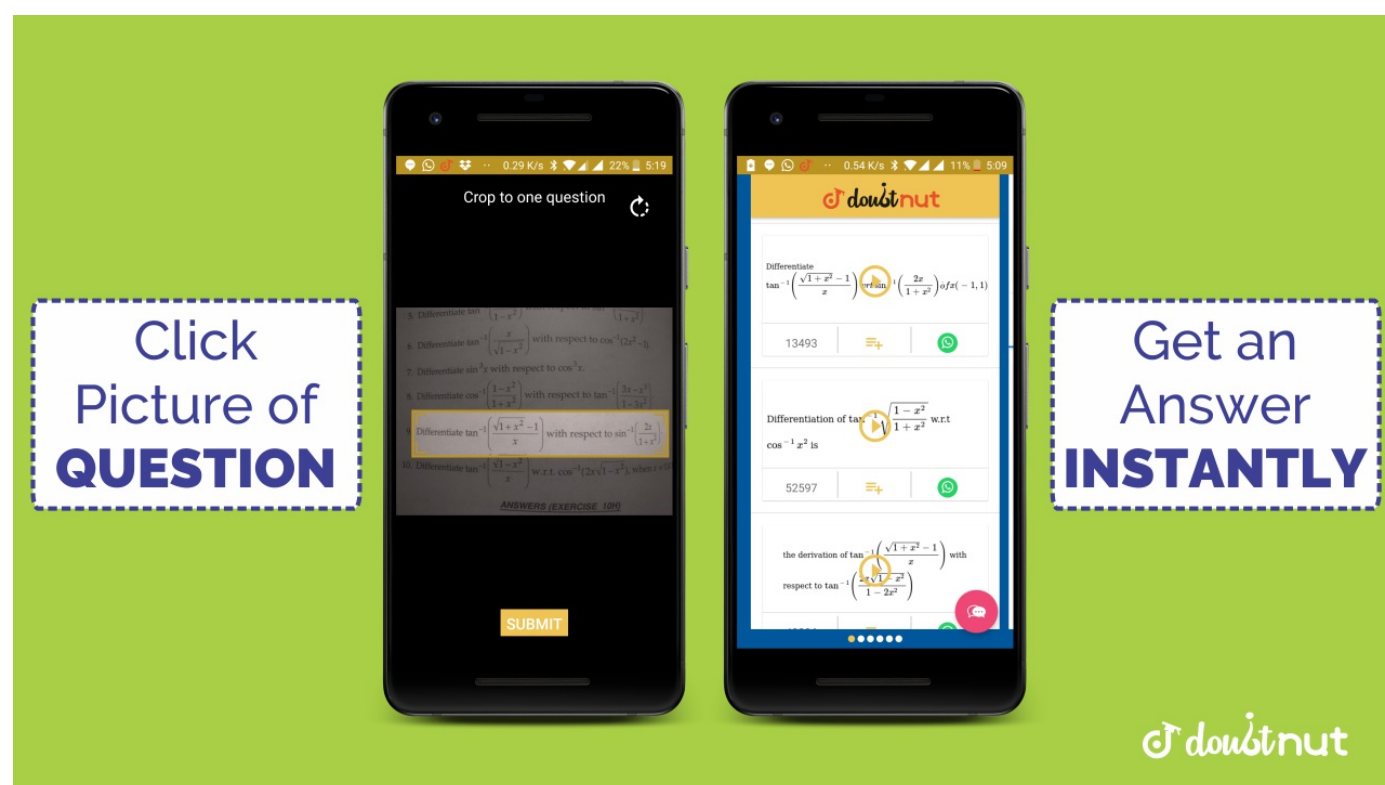decreasing when the foot of the ladder is 4 m away from the wall ?

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 11

11

A particle moves along the curve $6y = x^3 + 2$. Find the points on the curve at which the y-coordinate is changing 8 times as fast as the x-coordinate.

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 12

12

The radius of an air bubble is increasing at the rate of $\frac{1}{2} cm/s$. At what rate is the volume of the bubble increasing when the radius is 1 cm?

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 13

13

A balloon, which always remains spherical, has a variable diameter $\frac{3}{2}(2x + 1)$ .Find the rate of change of its volume with respect to x.

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 14

14

Sand is pouring from a pipe at the rate of 12 cm^3/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 cone increasing when the height is 4cm.

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15	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 15** The total cost C (x) in Rupees associated with the production of x units of an item is given by $C(x) = 0.007x^3 - 0$ $.003x^2 + 15x$ $+ 4000$. Find the marginal cost when 17 units are produced ▶ Watch Free Video Solution on Doubtnut
16	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 16** The total revenue in Rupees received from the sale of x units of a product is given by $R(x) = 13x^2 + 26x$ $+ 15$. Find the marginal revenue when $x \quad = \quad 7$. ▶ Watch Free Video Solution on Doubtnut
17	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 17** The rate of change of the area of a circle with respect to its radius r at $r \quad = \quad 6$ cm is (A) 10π (B) 12π (C) 8π (D) 11π ▶ Watch Free Video Solution on Doubtnut

18	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.1 - Q 18** The total revenue in Rupees received from the sale of x units of a product is given by $R(x) = 3x^2 + 36x$ $+ 5$. The marginal revenue, when $x \quad = \quad 15$ is (A) 116 (B) 96 (C) 90 (D) 126

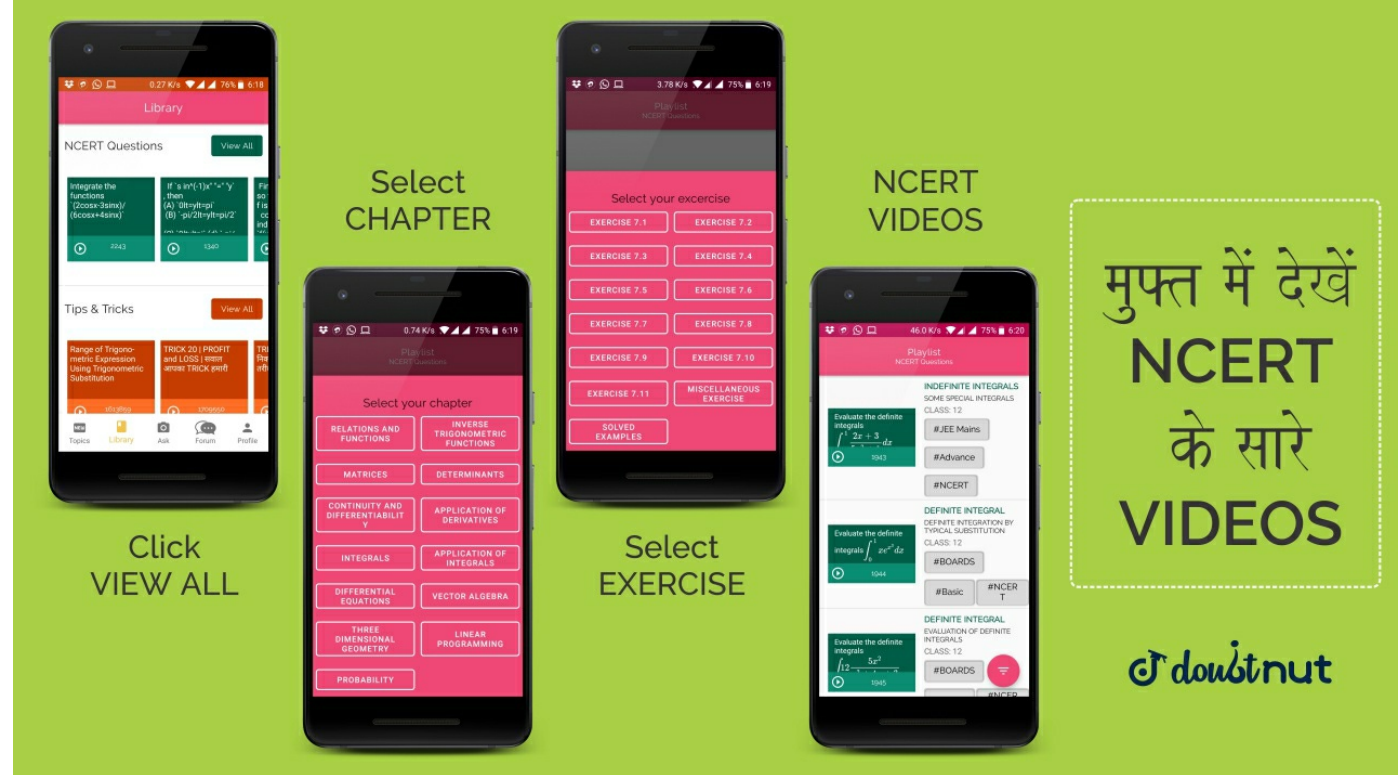| 19	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 1** Show that the function given by $f\ (x)\ =\ 3x$ $+\ 17$ is strictly increasing on R.
20	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 2** Show that the function given by $f(x) = e^{2x}$ is strictly increasing on R.
21	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 3** Show that the function given by f $f\ (x)\ =\ 3x$ $+\ 17(x)$ $=\ s\in\ x$ is (a) strictly increasing in $\left(0, \dfrac{\pi}{2}\right)$ (b) strictly decreasing in $\left(\dfrac{\pi}{2}, \pi\right)$ (c) neither increasing nor decreasing in $(0,\ \pi)$
22	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 4** Find the intervals in which the function f given by $f(x) = 2x^2 - 3x$ is (a) strictly increasing (b) strictly decreasing
23	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 5** Find the intervals in which the function f given by $f(x) = 2x^3 - 3x^2$ $-\ 36x + 7$ is (a) strictly increasing (b) strictly decreasing

NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 6

Find the intervals in which the following functions are strictly increasing or decreasing:
(a $x^2 + 2x - 5$ (b) $10 - 6x - 2x^2$ (c)
$-2x^3 - 9x^2 - 12x$
$+ 1$
(d) $6 - 9x - x^2$ (e) $(x + 1)^3(x - 3)^3$

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 7

Show that
$y = \log(1 + x)$
$- \dfrac{2x}{2 + x}, x \succ 1$
, is an increasing function of x throughout its domain.

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 8

Find the values of x for which $y = [x(x - 2)]^2$ is an increasing function

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 9

Prove that $y = \dfrac{4\sin\theta}{(2 + \cos\theta)} - \theta$ is an increasing function of θ in $\left[0, \dfrac{\pi}{2}\right]$.

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE

| 28 | **6.2 - Q 10**

Prove that the logarithmic function is strictly increasing on $(0, \infty)$.

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|---|---|
| 29 | **NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 11**

Prove that the function f given by $f(x) = x^2 - x + 1$ is neither strictly increasing nor strictly decreasing on $(\quad 1, \quad 1)$.

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| 30 | **NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 12**

Which of the following functions are strictly decreasing on $\left[0, \dfrac{\pi}{2}\right]$ (A) $\cos \quad x$ (B) $\cos \quad 2x$ (C) $\cos \quad 3x$ (D) $\tan \quad x$

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| 31 | **NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 13**

On which of the following intervals is the function f given by
$f(x) = x^{100} + \sin x$
$- 1$
strictly decreasing ? (A) (0, 1) (B) $\left(\dfrac{\pi}{2}, \pi\right)$ (C) $\left(0, \dfrac{\pi}{2}\right)$ (D) None of these

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| | **NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 14** |

32	Find the least value of a such that the function f given by $f(x) = x^2 + ax + 1$ is strictly increasing on $(1, \quad 2)$. ▶ Watch Free Video Solution on Doubtnut
33	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 15** Let I be any interval disjoint from $(1, \quad 1)$. Prove that the function f given by $f(x) = x + \dfrac{1}{x}$ is strictly increasing on 1. ▶ Watch Free Video Solution on Doubtnut
34	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 16** Prove that the function f given by $f(x)$ $= \quad \log \quad \sin$ x $f(x)$ $= \quad \log \quad \sin$ x is strictly increasing on $\left(0, \dfrac{\pi}{2}\right)$ and strictly decreasing on $\left(\dfrac{\pi}{2}, \pi\right)$. ▶ Watch Free Video Solution on Doubtnut
35	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 17** Prove that the function f given by $f \quad (x)$ $= \quad \log \quad \cos$ x is strictly decreasing on $\left(0, \dfrac{\pi}{2}\right)$ and strictly increasing on $\left(\dfrac{\pi}{2}, \pi\right)$ prove that the function f given by $f(x) = \log \sin x$ is strictly decreasing on $\left(0, \dfrac{\pi}{2}\right)$ and strictly increasing on $\left(\dfrac{\pi}{2}, \pi\right)$.. ▶ Watch Free Video Solution on Doubtnut

NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 18

Prove that the function given by
$f(x) = x^3 - 3x^2$
$+ 3x - 100$
is increasing in R.

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.2 - Q 19

The interval in which $y = x^2 e^{-x}$ is increasing is (A) $(-\infty, \infty)$ (B) $(2, 0)$ (C) $(2, \infty)$ (D) (0, 2)

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 1

Find the slope of the tangent to the curve $y = 3x^4 - 4x$ at $x = 4$.

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 2

Find the slope of the tangent to the curve $y = \dfrac{x-1}{x-2}, x \neq 2$ at $x = 10$.

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 3

Find the slope of the tangent to curve $y = x^3 - x + 1$ at the point whose x-coordinate is 2.

41	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 4** Find the slope of the tangent to the curve $y = x^3 - 3x + 2$ at the point whose x-coordinate is 3.

42	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 5** Find the slope of the normal to the curve $x = a\cos^3\theta, y$ $= \sin^3\theta$ at $\theta = \dfrac{\pi}{4}$.
43	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 6** Find the slope of the normal to the curve $x = 1 - a\sin\theta, y$ $= b\cos^2\theta$ at $\theta = \dfrac{\pi}{2}$.
44	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 7** Find points at which the tangent to the curve

$$y = x^3 - 3x^2 - 9x + 7$$

is parallel to the x-axis.

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45	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 8** Find a point on the curve $y = (x - 2)^2$ at which the tangent is parallel to the chord joining the points (2, 0) and (4, 4). ▶ Watch Free Video Solution on Doubtnut

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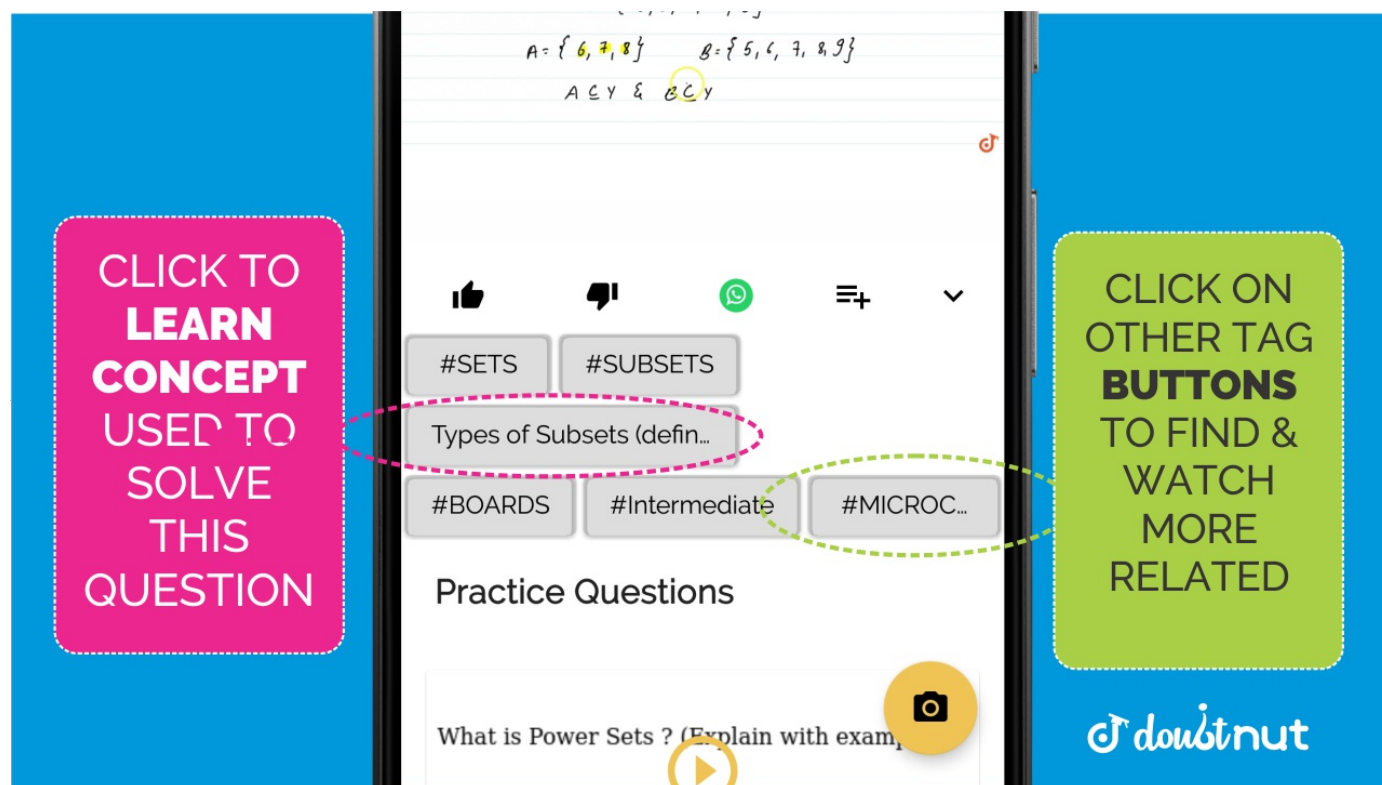| 46	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 9** Find the point on the curve $y = x^3 - 11x + 5$ at which the tangent is $y = x - 11$. ▶ Watch Free Video Solution on Doubtnut

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47	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 10** Find the equation of all lines having slope 1 that are tangents to the curve $y = \dfrac{1}{x - 1}, x \neq 1$. ▶ Watch Free Video Solution on Doubtnut

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48	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 11** Find the equation of all lines having slope 2 which are tangents to the curve $y = \dfrac{1}{x - 3}, x \neq 3$

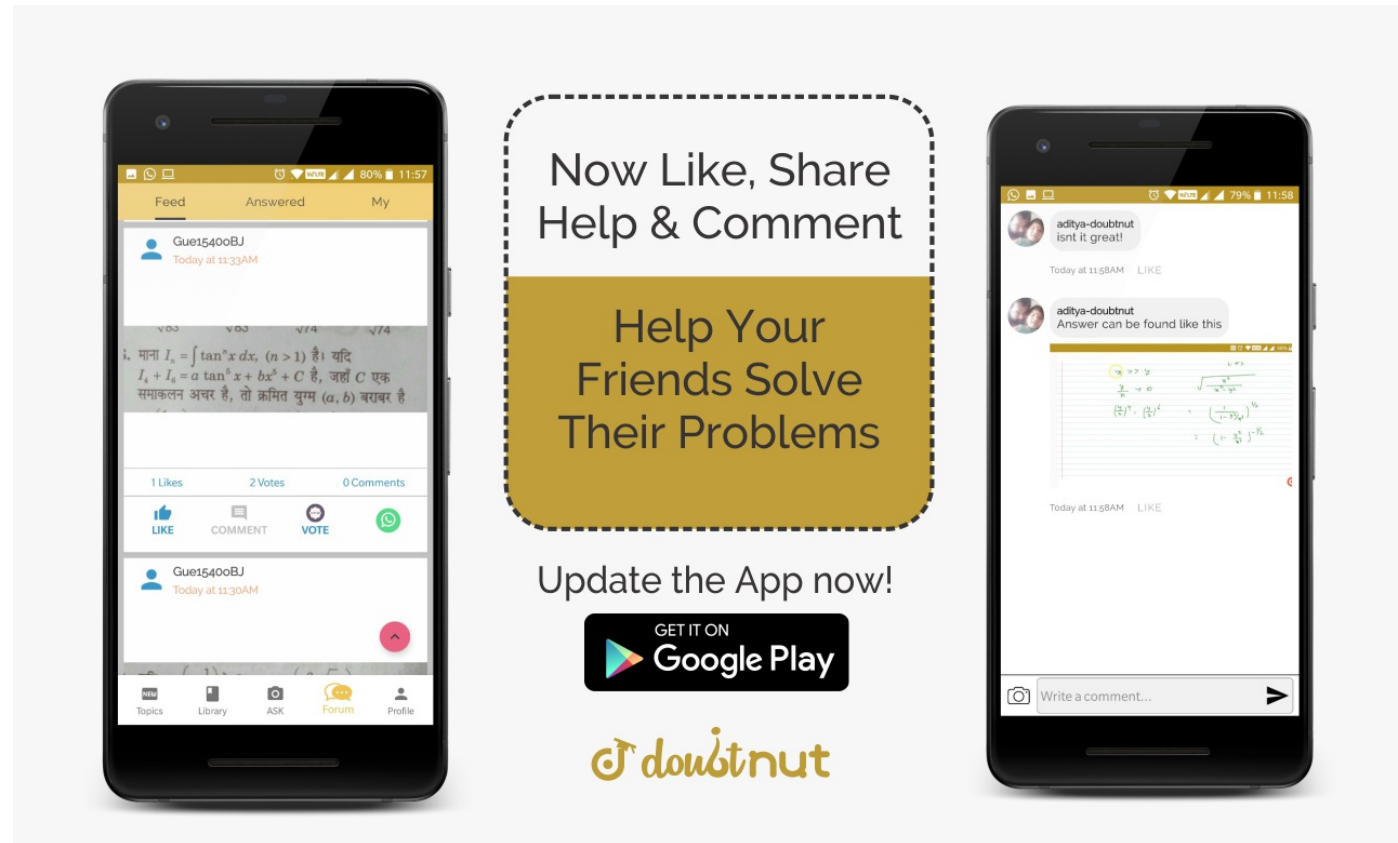|	
49	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 12** Find the equations of all lines having slope 0 which are tangent to the curve $y = \dfrac{1}{x^2 - 2x + 3}$. ▶ Watch Free Video Solution on Doubtnut
50	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 13** Find points on the curve $\dfrac{x^2}{9} + \dfrac{y^2}{16} = 1$ at which the tangents are (i) parallel to x-axis (ii) parallel to y-axis. ▶ Watch Free Video Solution on Doubtnut
51	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 14** Find the equations of the tangent and normal to the given curves at the indicated points: (i) $y = x^4 - 6x^3 + 13x^2 - 10x + 5$ at $(0, \quad 5)$ (ii) $y = x^4 - 6x^3 + 13x^2 - 10x + 5$ at $(1, \quad 3)$ (iii) $y = x^3$ at $(1, \quad 1)$ (iv) $y = x^2$ at $(0, \quad 0)$ (v) $x = \cos t$,y=sin t at $t = \dfrac{\pi}{4}$ ▶ Watch Free Video Solution on Doubtnut
52	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 15** Find the equation of the tangent line to the curve $y = x^2 - 2x + 7$ which is (a) parallel to the line $2x \quad y \quad + \quad 9 \quad = \quad 0$ (b) perpendicular to the line $5y \quad 15x \quad = \quad 13$. ▶ Watch Free Video Solution on Doubtnut

53	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 16** Show that the tangents to the curve $y = 7x^3 + 11$ at the points where $x = 2$ and $x = 2$ are parallel. ▶ Watch Free Video Solution on Doubtnut
54	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 17** 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. ▶ Watch Free Video Solution on Doubtnut
55	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 18** For the curve $y = 4x^3 - 2x^5$, find all the points at which the tangent passes through the origin. ▶ Watch Free Video Solution on Doubtnut
56	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 19** Find the points on the curve $x^2 + y^2 - 2x - 3 = 0$ at which the tangents are parallel to the x-axis. ▶ Watch Free Video Solution on Doubtnut
	NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 20

| 57 | Find the equation of the normal at the point $\left(am^2, am^3\right)$ for the curve $ay^2 = x^3$.

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|---|---|
| 58 | **NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 21**

Find the equation of the normals to the curve $y = x^3 + 2x + 6$ which are parallel to the line
$$x \quad + \quad 14y$$
$$+ \quad 4 \quad = \quad 0$$
.

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| 59 | **NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 22**

Find the equations of the tangent and normal to the parabola $y^2 = 4ax$ at the point $\left(at^2, 2at\right)$.

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| 60 | **NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 23**

Prove that the curves $x = y^2$ and $xy \quad = \quad k$ cut at right angles* if $8k^2 = 1$.

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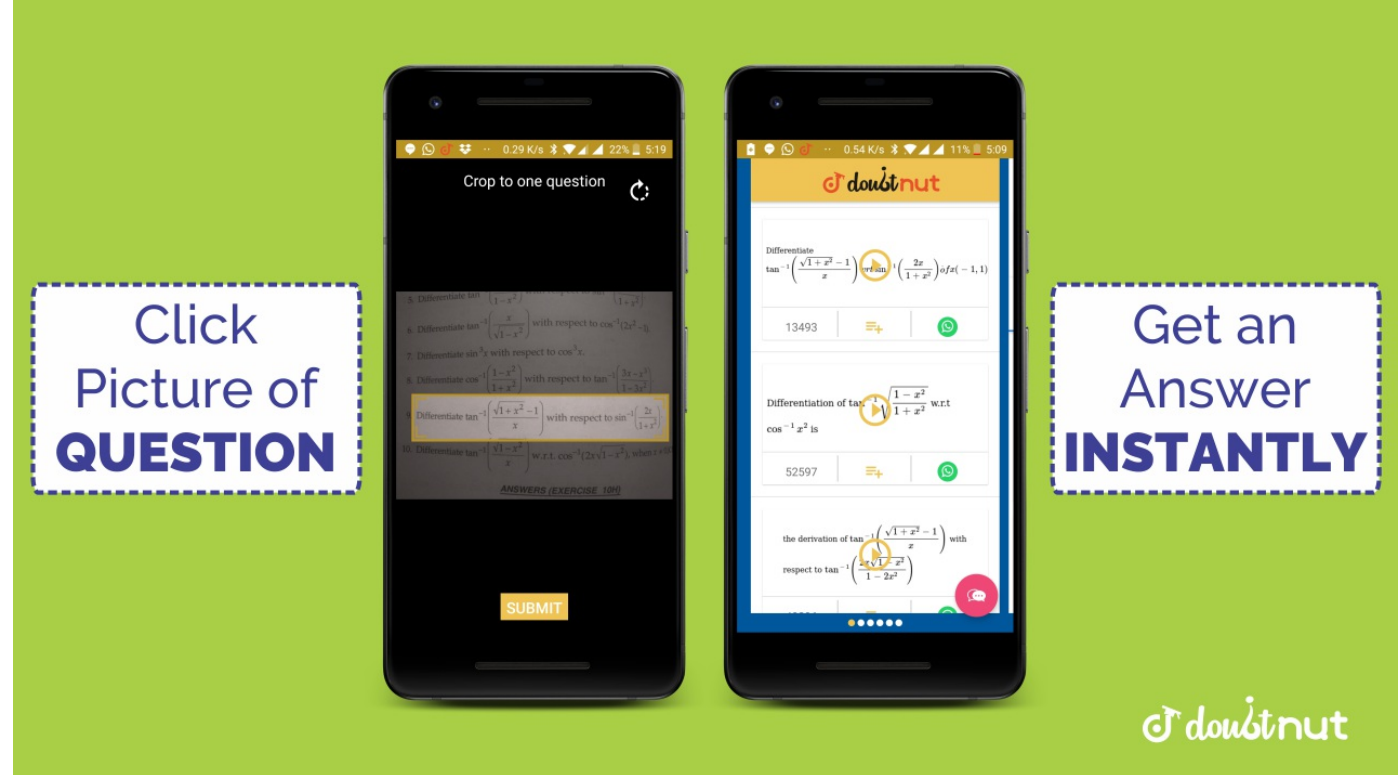| 61	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 24** Find the equations of the tangent and normal to the hyperbola $\dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 1$. at the point (x_0, y_0) ▶ Watch Free Video Solution on Doubtnut
62	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 25** Find the equation of the tangent to the curve $y = \sqrt{3x - 2}$ which is parallel to the line $4x - 2y + 5 = 0$. ▶ Watch Free Video Solution on Doubtnut
63	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 26** The slope of the normal to the curve $y = 2x^2 + 3 \sin x$ at $x = 0$ is (A) 3 (B) $\dfrac{1}{3}$ (C)-3 (D) $-\dfrac{1}{3}$ ▶ Watch Free Video Solution on Doubtnut
64	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.3 - Q 27** The line $y = x + 1$ is a tangent to the curve $y^2 = 4x$ at the point (A) $(1, 2)$ (B)$(2, 1)$ (C) $(1, 2)$ (D) $(1, 2)$ ▶ Watch Free Video Solution on Doubtnut
65	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.4 - Q 1** Using differentials, find the approximate value of each of the following up to 3 places of decimal. (i) $\sqrt{25.3}$ (ii) $\sqrt{49.5}$ (iii) $\sqrt{0.6}$ (iv) $(0.009)^{\frac{1}{3}}$ (v) $(0.999)^{\frac{1}{10}}$ (vi) $(15)^{\frac{1}{4}}$ (vii) `(26) ▶ Watch Free Video Solution on Doubtnut

NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.4 - Q 2

Find the approximate value of $f(2.01)$, where
$f(x) = 4x^2 + 5x$
$+ 2$
.

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.4 - Q 3

Find the approximate value of f (5.001) , where
$f(x) = x^3 - 7x^2$
$+ 15$
.

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.4 - Q 4

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

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68

NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.4 - Q 5

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

69

70	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.4 - Q 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.
71	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.4 - Q 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.
72	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.4 - Q 8** If $$f(x) = 3x^2 + 15x + 5,$$ then the approximate value of f (3.02) is (A) 47.66 (B) 57.66 (C) 67.66 (D) 77.66
73	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.4 - Q 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 $x^3 m^3$ (B) 0.6 $x^3 m^3$ (C) 0.09 $x^3 m^3$ (D) 0.9 $x^3 m^3$

74	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 1** Find the maximum and minimum values, if any, of the following functions given by (i) $f(x) = (2x - 1)^2$ + 3 (ii) $f(x) = 9x^2 + 12x$ + 2 (iii) $f(x) = -(x - 1)^2$ + 10 (iv) $g(x) = x^3 + 1$ ▶ Watch Free Video Solution on Doubtnut
75	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 2** Find the maximum and minimum values, if any, of the following functions given by (i) $f(x) = |x + 2| - 1$ (ii) $g(x) = |x+1|+3$ (iii) $h(x) = \sin(2x) + 5$ (iv) $f(x) = |\sin 4x + 3|$ ▶ Watch Free Video Solution on Doubtnut
76	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 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) $f(x) = x^2$ (ii) $g(x) = x^3 - 3x$ (iii) $h(x) = \sin x + \cos x, 0 < x < \frac{\pi}{2}$ (iv) $f(x) = \sin x - \cos x, 0 < x < 2\pi$ (v) $f(x) = x^3 - 6x^2 + 9x + 15$

(vi)
$$g(x) = \frac{x}{2} + \frac{2}{x}, x$$
$$> 0$$
(vii) g(x) = 1/x^2 +2 $(viii)$ f(x) = x sqrt(1-x) , x gt 0`

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 4

Prove that the following functions do not have maxima or minima: (i)
$$f \ (x) \ = \ ex \text{ (ii)}$$
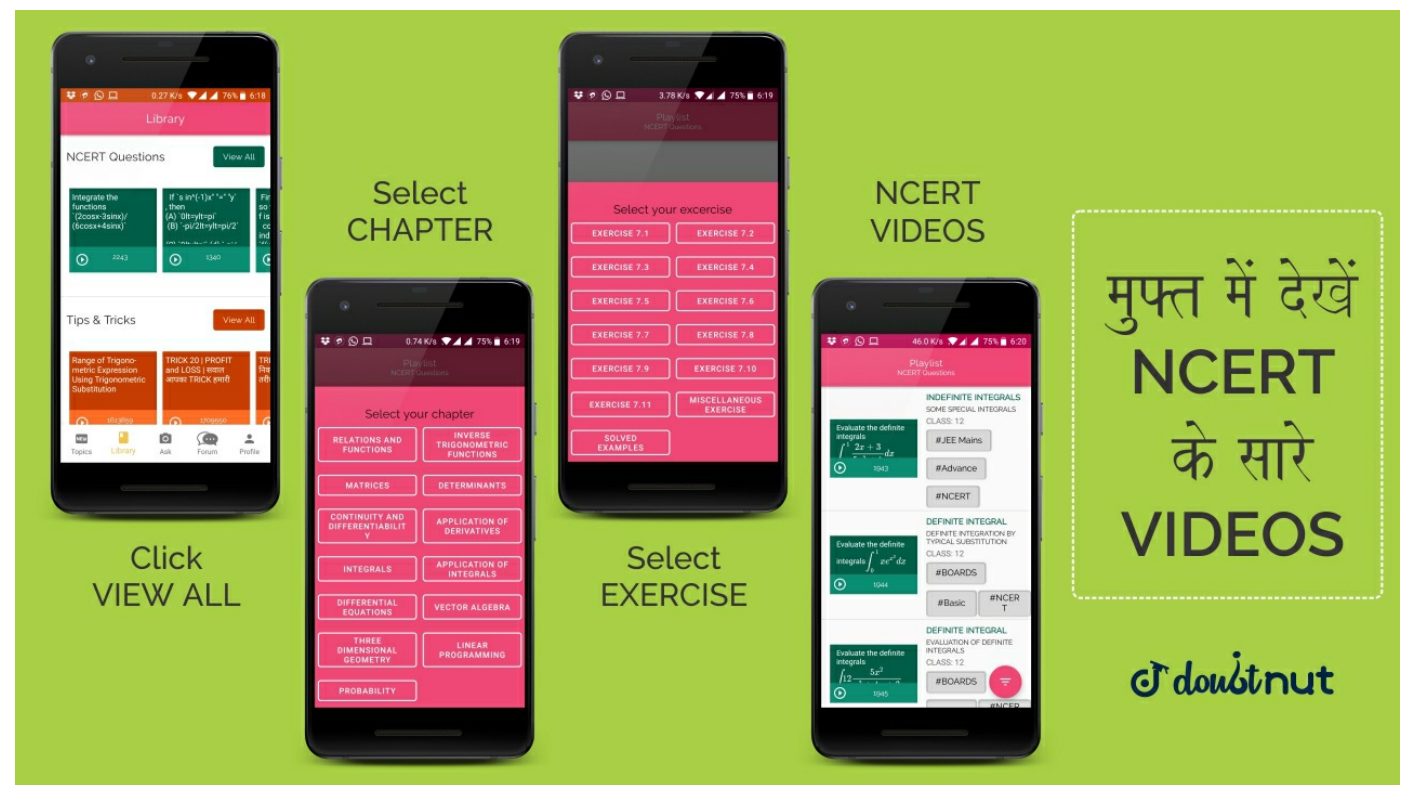$$g(x)$$
$$= \ \log \ x$$
(iii)
$$h(x) = x^3 + x^2 + x$$
$$+ 1$$

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 5

Find the absolute maximum value and the absolute minimum value of the following functions in the given intervals: (i)
$$f(x) = x^2, x$$
$$\in [-2, 2]$$
(ii)
$$f(x) = \sin x$$
$$+ \cos x, x \in [0, \pi]$$
(iii)
$$f(x) = 4x - \frac{1}{2}x^2, x$$
$$\in \left[-2, \frac{9}{2} \right]$$
(iv) `f(x)=(x-1)

79	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 6** Find the maximum profit that a company can make, if the profit function is given by $p(x) = 41 - 24x$ $- 18x^2$ ▶ Watch Free Video Solution on Doubtnut
80	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 7** Find both the maximum value and the minimum value of $3x^4 - 8x^3 + 12x^2$ $- 48x + 25$ on the interval [0, 3]. ▶ Watch Free Video Solution on Doubtnut
81	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 8** At what points in the interval $[0, 2\pi]$, does the function $\sin 2x$ attain its maximum value? ▶ Watch Free Video Solution on Doubtnut
82	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 9** What is the maximum value of the function $\sin x + \cos x$? ▶ Watch Free Video Solution on Doubtnut
83	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 10** Find the maximum value of $2x^3 - 24x + 107$ in the interval [1, 3]. Find the maximum value of the same function in $[3, 1]$. ▶ Watch Free Video Solution on Doubtnut

84	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 11** 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. ▶ Watch Free Video Solution on Doubtnut
85	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 12** Find the maximum and minimum values of $x + s \in 2x$ on $[0, 2\pi]$. ▶ Watch Free Video Solution on Doubtnut
86	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 13** Find two numbers whose sum is 24 and whose product is as large as possible. ▶ Watch Free Video Solution on Doubtnut
87	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 14** Find two positive numbers x and y such that $x + y = 60$ and xy^3 is maximum. ▶ Watch Free Video Solution on Doubtnut
88	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 15** Find two positive numbers x and y such that their sum is 35 and the product $x^2 y^5$ is a maximum.

NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 16

89

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

NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 17

90

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?

NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 18

91

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 ?

92	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 19** Show that of all the rectangles inscribed in a given fixed circle, the square has the maximum area. ▶ Watch Free Video Solution on Doubtnut
93	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 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. ▶ Watch Free Video Solution on Doubtnut
94	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 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? ▶ Watch Free Video Solution on Doubtnut
95	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 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? ▶ Watch Free Video Solution on Doubtnut

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96	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 23** Prove that the volume of the largest cone that can be inscribed in a sphere of radius R is $\dfrac{8}{27}$ of the volume of the sphere. ▶ Watch Free Video Solution on Doubtnut
97	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 24** Show that the right circular cone of least curved surface and given volume has an altitude equal to $\sqrt{2}$ time the radius of the base. ▶ Watch Free Video Solution on Doubtnut
98	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 25** Show that the semi-vertical angle of the cone of the maximum volume and of given slant height is $\tan^{-1}\sqrt{2}$. ▶ Watch Free Video Solution on Doubtnut
99	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 26** Show that semi-vertical angle of right circular cone of given surface area and maximum volume is $\sin^{-1}\left(\dfrac{1}{3}\right)$. ▶ Watch Free Video Solution on Doubtnut
100	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 27** The point on the curve $x^2 = 2y$ which is nearest to the point (0, 5) is (A) $\left(2\sqrt{2}, 4\right)$ (B) $\left(2\sqrt{2}, 0\right)$ (C) (0, 0) (D) (2, 2) ▶ Watch Free Video Solution on Doubtnut

101	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 28** For all real values of x, the minimum value of $\dfrac{1-x+x^2}{1+x+x^2}$ is (A) 0 (B) 1 (C) 3 (D) $\dfrac{1}{3}$ ▶ **Watch Free Video Solution on Doubtnut**
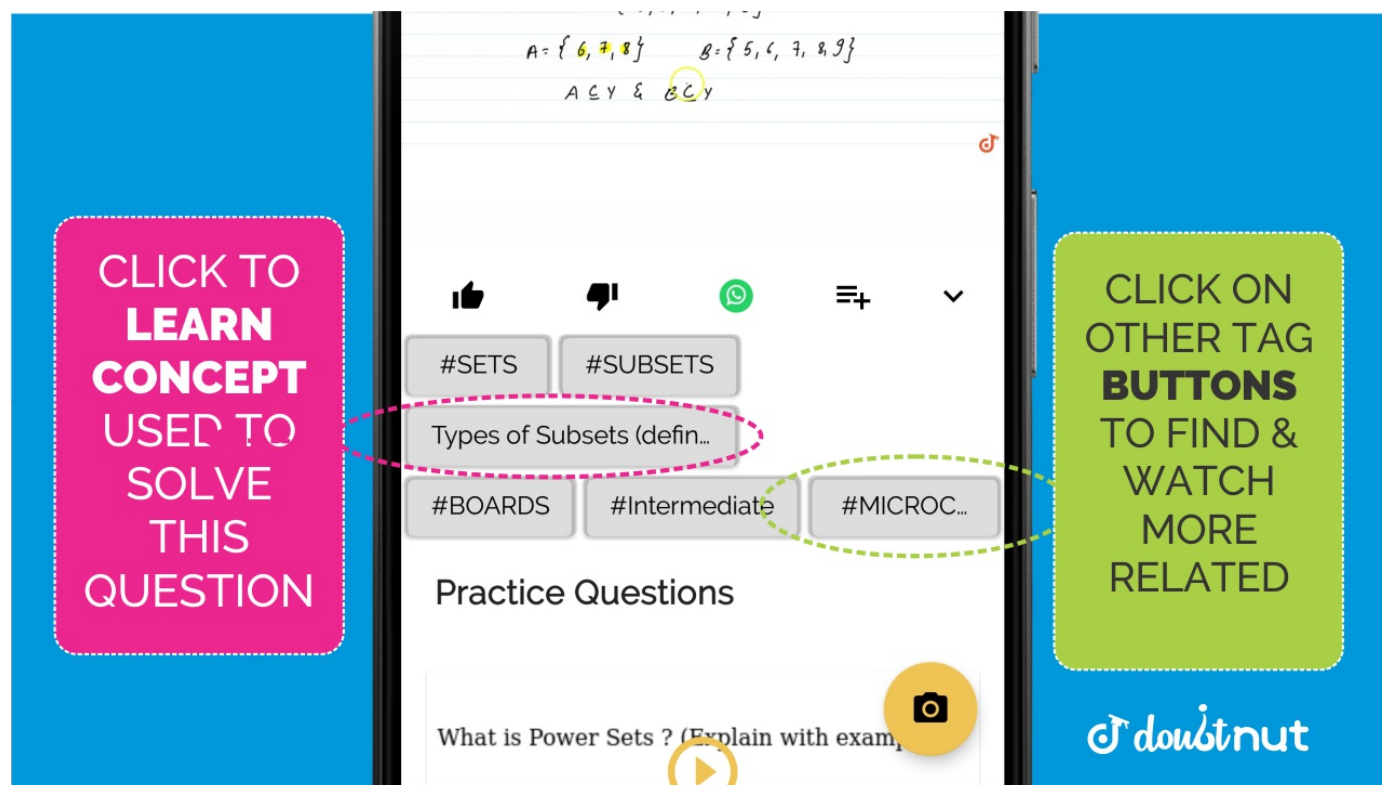
102	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - EXERCISE 6.5 - Q 29** The maximum value of $[x(x-1)+1]^{\frac{1}{3}}, 0 \le x \le 1$ is (A) $\left(\dfrac{1}{3}\right)^{\frac{1}{3}}$ (B) $\dfrac{1}{2}$ (C) 1 (D) 0 ▶ **Watch Free Video Solution on Doubtnut**
103	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 2** Show that the function given by $f(x) = \dfrac{\log x}{x}$ has maximum at $x = e$. ▶ **Watch Free Video Solution on Doubtnut**
104	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 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 ? ▶ **Watch Free Video Solution on Doubtnut**
	NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES -

MISCELLANEOUS EXERCISE - Q 4

Find the equation of the normal to curve $x^2 = 4y$ which passes through the point (1, 2).

▶ Watch Free Video Solution on Doubtnut

NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 5

Show that the normal at any point θ to the curve
$x = a\cos\theta + a\theta\sin\theta,$
$y = a\sin\theta - a\theta\cos\theta$

is at a constant distance from the origin.
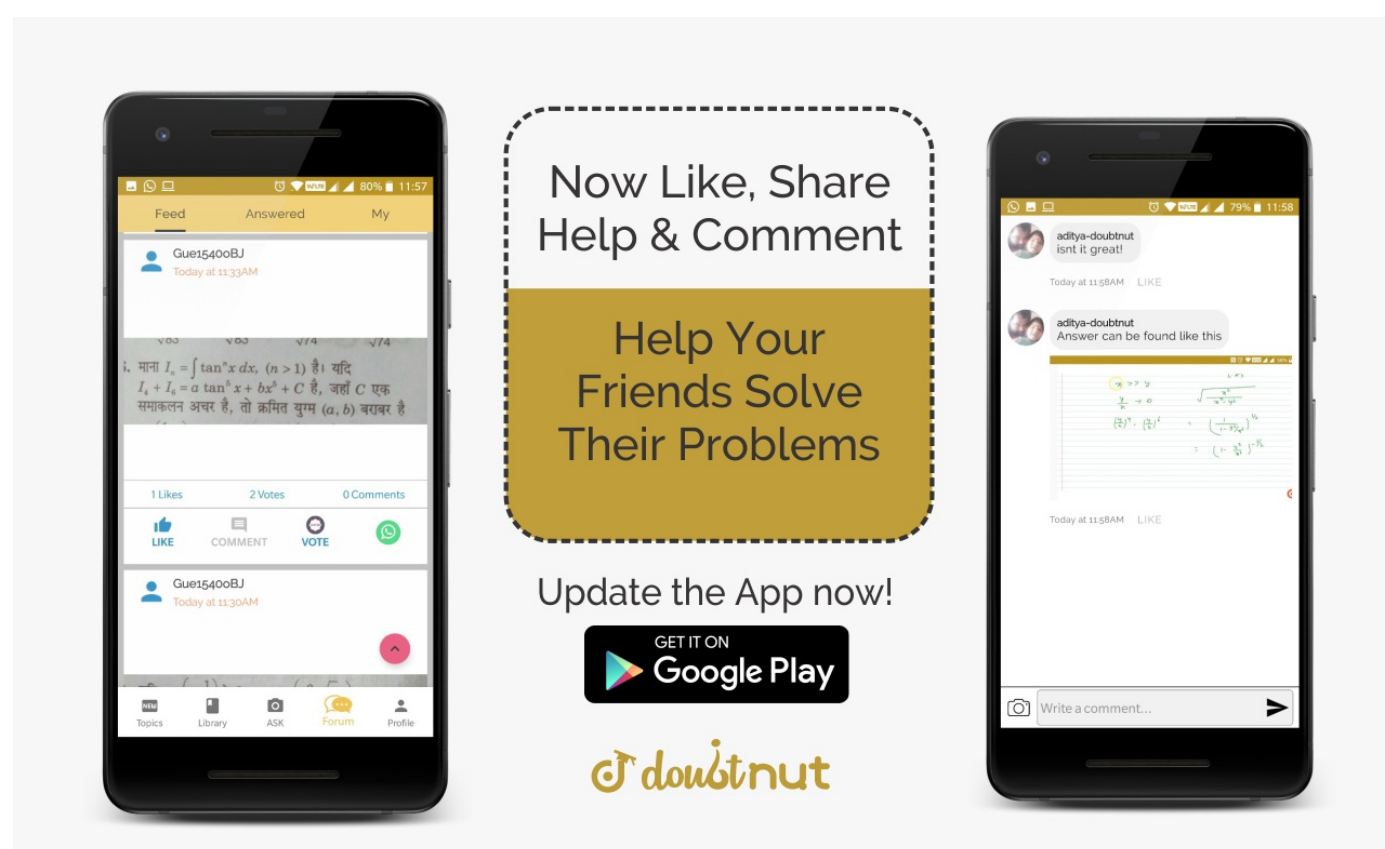
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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 6

Find the intervals in which the function f given by $f(x) = \dfrac{4\sin x - 2x - x\cos x}{2 + \cos x}$ is (i) increasing (ii) decreasing.

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 7

Find the intervals in which the function f given by
$f(x) = x^3 + \dfrac{1}{x^3}, x$
$\neq 0$

is (i) increasing (ii) decreasing.

> ▶ Watch Free Video Solution on Doubtnut

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109	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 8** Find the maximum area of an isosceles triangle inscribed in the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ with its vertex at one end of the major axis. ▶ Watch Free Video Solution on Doubtnut
110	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 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 m^3 . If building of tank costs Rs 70 per sq metres for the base and Rs 45 per square metre for sides. What is the ▶ Watch Free Video Solution on Doubtnut
111	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 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. ▶ Watch Free Video Solution on Doubtnut
112	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 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. ▶ Watch Free Video Solution on Doubtnut
113	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 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 $\left(a^{\frac{2}{3}} + b^{\frac{2}{3}} \right)^{\frac{3}{2}}$. ▶ Watch Free Video Solution on Doubtnut
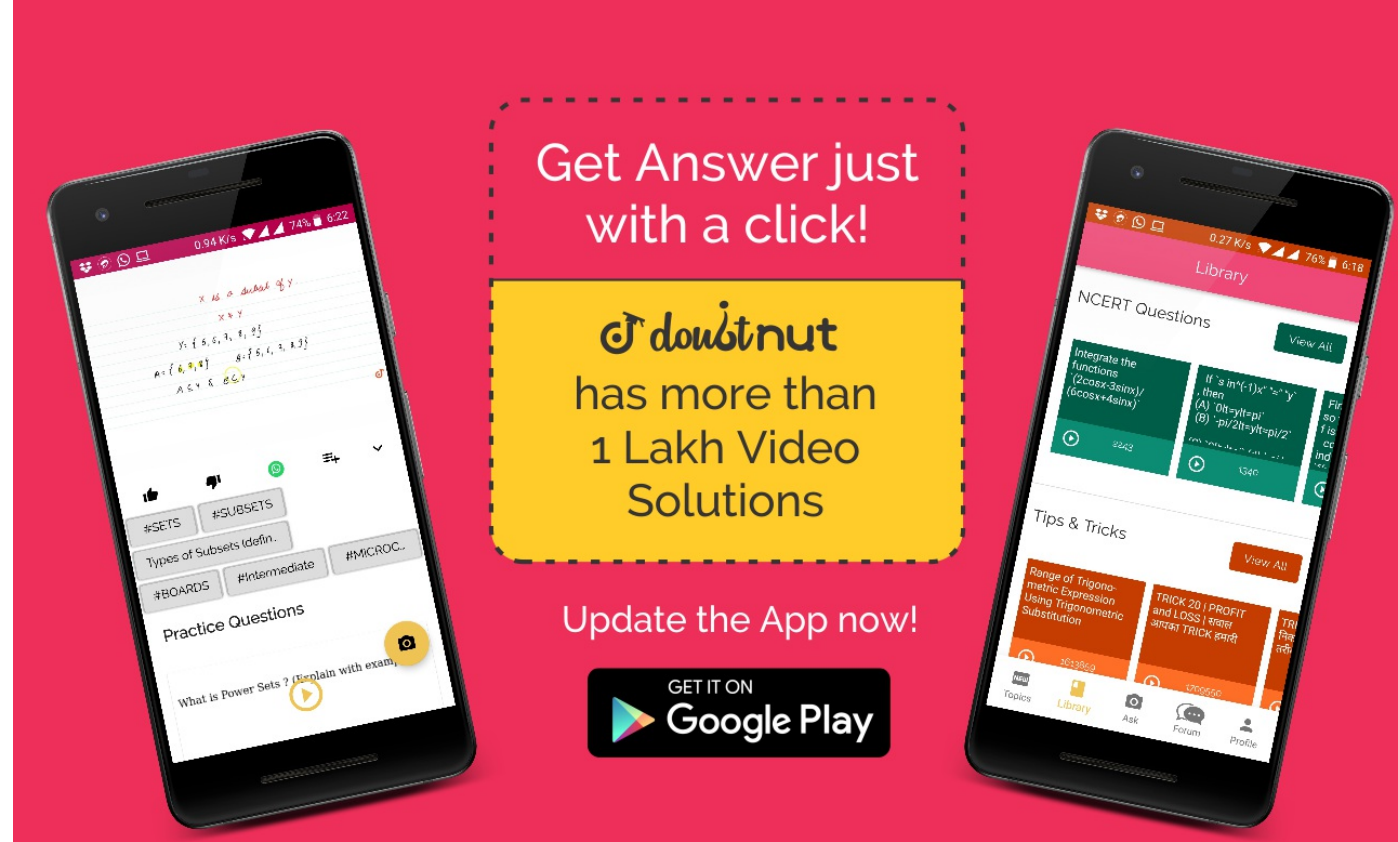
NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 13

114

Find the points at which the function f given by
$$f(x) = (x - 2)^4 (x + 1)^3$$
has (i) local maxima (ii) local minima (iii) point of inflexion

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 14

115

Find the absolute maximum and minimum values of the function f given by
$$f(x) = \cos^2 x + \sin x,$$
$$x \in [0, \pi]$$

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 15

116

Show that the altitude of the right circular cone of maximum volume that can be inscribed in a sphere of radius r is $\dfrac{4r}{3}$.

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 16

117

Let f be a function defined on [a, b] such that $f'(x) > 0$, for all $x \in (a, b)$. Then prove that f is an increasing function on (a, b).

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118	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 17** Show that the height of the cylinder of maximum volume that can be inscribed in a sphere of radius R is $\dfrac{2R}{\sqrt{3}}$. Also find the maximum volume. ► Watch Free Video Solution on Doubtnut
119	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 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 $\dfrac{4}{27}\pi h^3 \tan^2 \alpha$. ► Watch Free Video Solution on Doubtnut
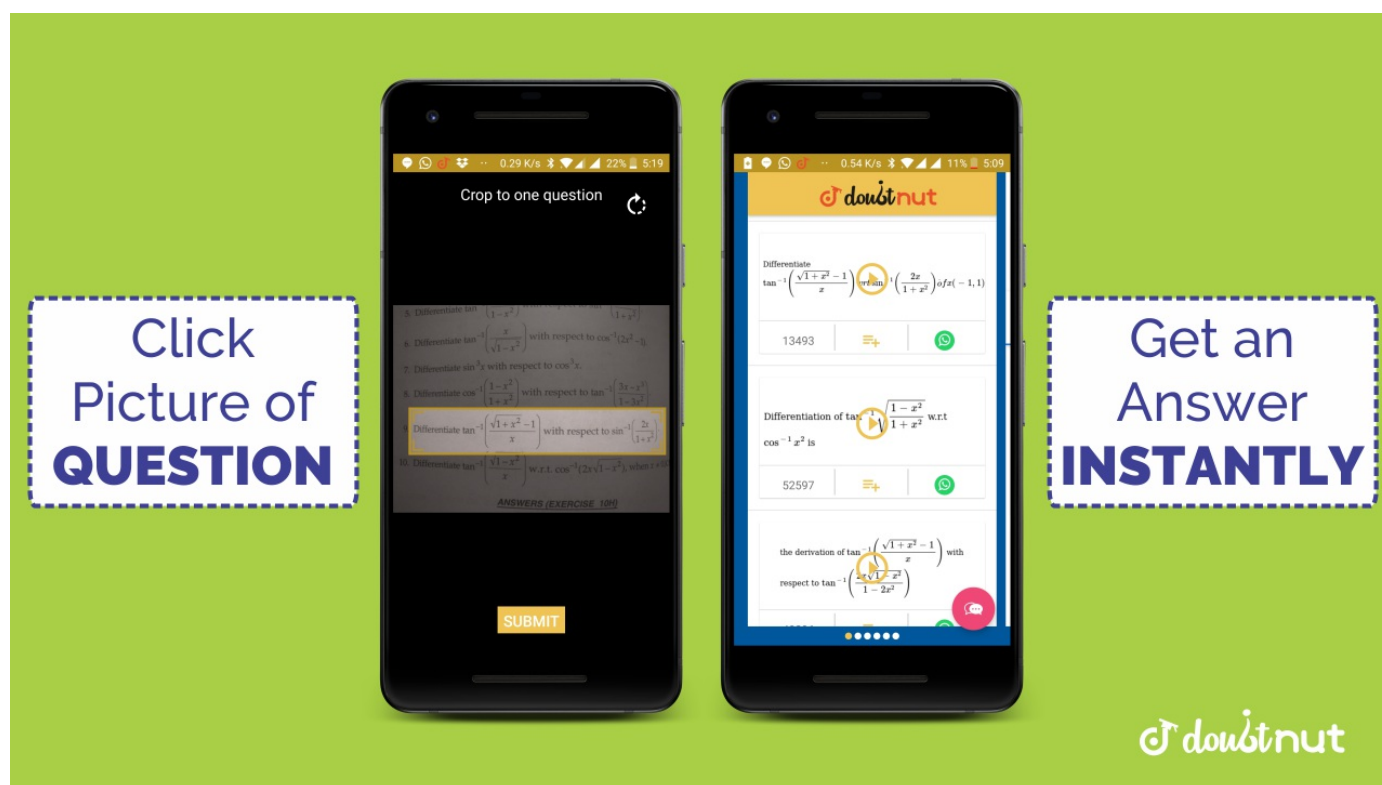
120	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 19** A cylindrical tank of radius 10 m is being filled with wheat at the rate of 314 cubic metre per hour. Then the depth of the wheat is increasing at the rate of (A) 1 m^3 / h (B) 0.1 m^3 / h (C) 1.1 m^3 / h (D) 0.5 m^3 / h ► Watch Free Video Solution on Doubtnut
121	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 20** The slope of the tangent to the curve $x = t^2 + 3t - 8,\ y = 2t^2 - 2t - 5$ at the point $(2,\ \ 1)$ is (A) $\dfrac{22}{7}$ (B) $\dfrac{6}{7}$ (C) $\dfrac{7}{6}$ (D) $\dfrac{-6}{7}$ ► Watch Free Video Solution on Doubtnut
	NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES -

122	**MISCELLANEOUS EXERCISE - Q 21** The line $y = mx$ $+ 1$ is a tangent to the curve $y^2 = 4x$ if the value of m is (A) 1 (B) 2 (C) 3 (D) $\dfrac{1}{2}$ ▶ Watch Free Video Solution on Doubtnut
123	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 22** The normal at the point (1,1) on the curve $2y + x^2 = 3$ is (A) $x + y = 0$ (B) $x \quad y = 0$ (C) $x + y + 1$ $= 0$ (D) $x \quad y = 0$ ▶ Watch Free Video Solution on Doubtnut
124	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 23** The normal to the curve $x^2 = 4y$ passing (1,2) is (A) $x + y = 3$ (B) $x \quad y = 3$ (C) $x + y = 1$ (D) $x \quad y = 1$ ▶ Watch Free Video Solution on Doubtnut
125	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - MISCELLANEOUS EXERCISE - Q 24** The points on the curve $9y^2 = x^3$, where the normal to the curve makes equal intercepts with the axes are (A) $\left(4, \pm \dfrac{8}{3}\right)$ (B) $\left(4, \dfrac{-8}{3}\right)$ (C) $\left(4, \pm \dfrac{3}{8}\right)$ (D) $\left(\pm 4, \dfrac{3}{8}\right)$ ▶ Watch Free Video Solution on Doubtnut

126	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 1** Find the rate of change of the area of a circle per second with respect to its radius r when $r = 5$ cm. ▶ Watch Free Video Solution on Doubtnut
127	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 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? ▶ Watch Free Video Solution on Doubtnut
128	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 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? ▶ Watch Free Video Solution on Doubtnut
129	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 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 $x = 10$ cm and $y = 6$ cm, find the rates of change of (a) the perimeter and (b) the area of the rectangle. ▶ Watch Free Video Solution on Doubtnut
	NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 5 The total cost C(x) in Rupees, associated with the production of x units of an item is given by

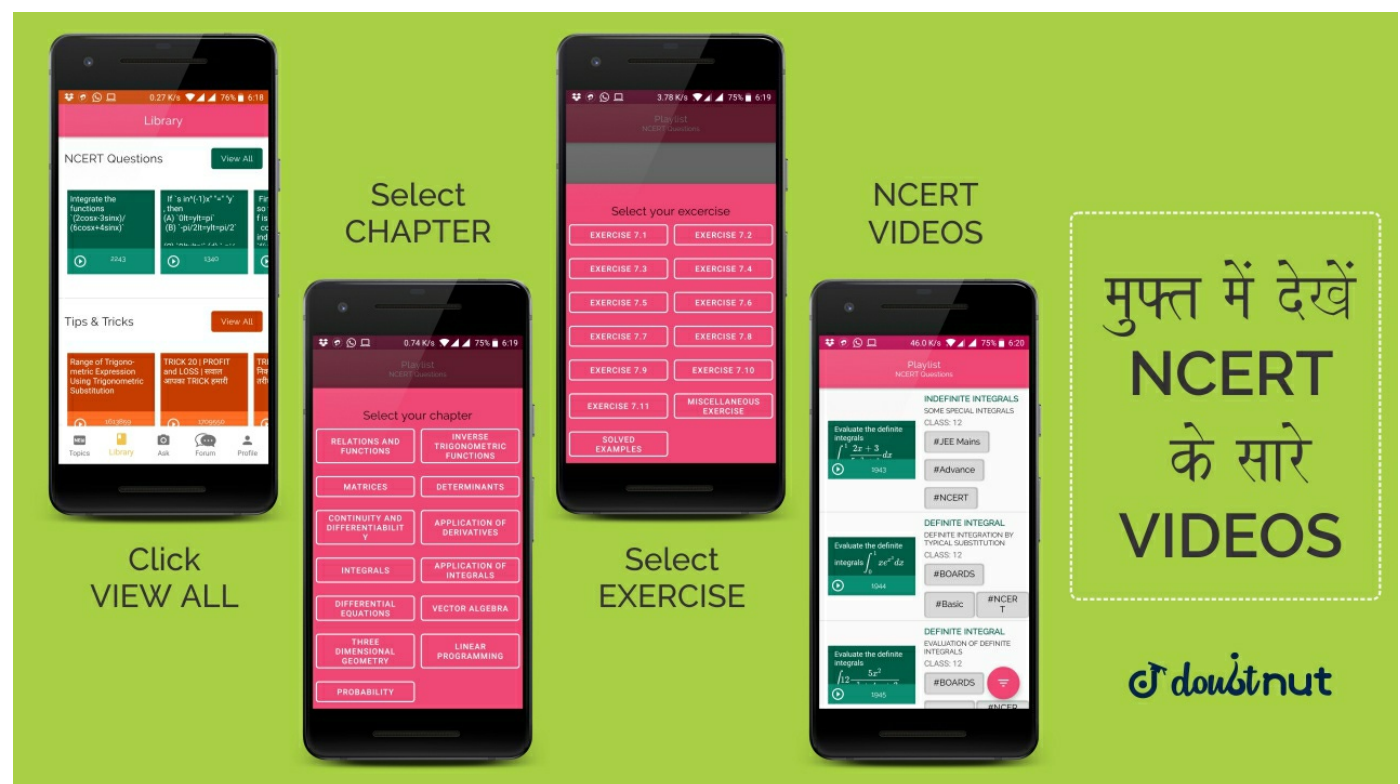|	
130	$C(x) = 0.005x^3 - 0$ $.02x^2 + 30x + 5000$. Find the marginal cost when 3 units are produced, where by marginal cost we mean the instantaneous rate of change of total cost at any level of output. ▶ Watch Free Video Solution on Doubtnut
131	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 6** The total revenue in Rupees received from the sale of x units of a product is given by $R(x) = 3x^2 + 36x$ $+ 5$. Find the marginal revenue, when $x = 5$, where by marginal revenue we mean the rate of change of total revenue with respect to the nu ▶ Watch Free Video Solution on Doubtnut
132	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 7** Show that the function given by $f(x) = 7x$ 3 is strictly increasing on R. ▶ Watch Free Video Solution on Doubtnut
133	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 8** Show that the function f given by $f(x) = x^3 - 3x^2$ $+ 4x, x \in R$ is strictly increasing on R. ▶ Watch Free Video Solution on Doubtnut

134	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 9** Prove that the function given by $f(x)$ $= \cos x$ is (a) strictly decreasing in $(0, \pi)$ (b) strictly increasing in $(\pi, 2\pi)$, and (c) neither increasing nor decreasing in $(0, 2\pi)$ ▶ Watch Free Video Solution on Doubtnut
135	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 10** Find the intervals in which the function f given by $f(x) = x^2 - 4x + 6$ is (a) strictly increasing (b) strictly decreasing ▶ Watch Free Video Solution on Doubtnut
136	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 11** Find the intervals in which the function f given by $f(x) = 4x^3 - 6x^2$ $- 72x + 30$ is (a) strictly increasing (b) strictly decreasing ▶ Watch Free Video Solution on Doubtnut
137	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 12** Find intervals in which the function given by $f(x) = \sin 3x$, $x \in \left[0, \dfrac{\pi}{2}\right]$ is (a) increasing (b) decreasing. ▶ Watch Free Video Solution on Doubtnut

138	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 13** Find the intervals in which the function f given by $f(x) = \sin x + \cos x, \quad 0x$ is strictly increasing or strictly decreasing. ► Watch Free Video Solution on Doubtnut
139	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 14** Find the slope of the tangent to the curve $y = x^3 - x \quad at$ $x = 2$. ► Watch Free Video Solution on Doubtnut
140	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 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. . ► Watch Free Video Solution on Doubtnut
141	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 16** Find the equation of all lines having slope 2 and being tangent to the curve $y + \dfrac{2}{x-3} = 0$. ► Watch Free Video Solution on Doubtnut
142	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 17** Find points on the curve $\dfrac{x^2}{4} + \dfrac{y^2}{25} = 1$ at which the tangents are (i) parallel to x-axis (ii) parallel to y-axis. ► Watch Free Video Solution on Doubtnut
143	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 18** Find the equation of the tangent to the curve $y = \dfrac{x-7}{(x-2(x-3)}$ at the point where it cuts the x-axis.

NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 19

144

Find the equations of the tangent and normal to the curve $x^{\frac{2}{3}} + y^{\frac{2}{3}} = 2$ at (1, 1)

NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 20

145

Find the equation of tangent to the curve given by
$x = a \sin^3 t, y$
$= b \cos^3 t$
... (1) at a point where $t = \dfrac{\pi}{2}$.

NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 21

146

Use differential to approximate $\sqrt{36.6}$

NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 22

147

The line y=mx+1 is a tangent to the curve $y^2 = 4x$ if the value of m is (A) 1 (B) 2 (C) 3 (D) 1/2 .

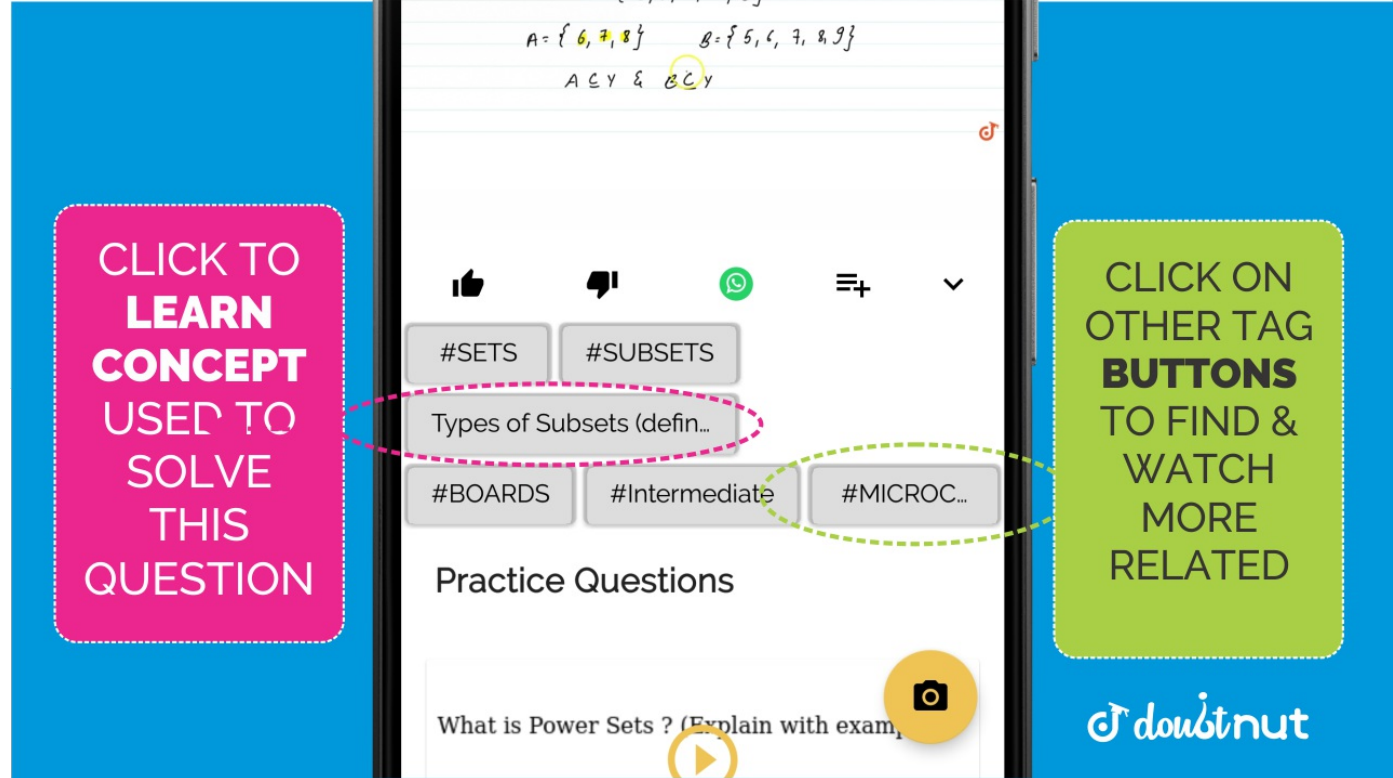|	
148	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 23** Find the approximate value of f(3.02), where $f(x) = 3x^2 + 5x$ $+ 3$. ▶ Watch Free Video Solution on Doubtnut
149	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 24** Find the approximate change in the volume V of a cube of side x meters caused by increasing the side by 2%. ▶ Watch Free Video Solution on Doubtnut
![doubtnut logo] पढ़ना हुआ आसान	 DAILY PRACTICE PROBLEMS DAILY PRACTICE LESSONS
150	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 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. ▶ Watch Free Video Solution on Doubtnut
	NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED

151	 Find the maximum and the minimum values, if any, of the function f given by $f(x) = x^2, x \in R$. ▶ Watch Free Video Solution on Doubtnut
152	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 27** Find the maximum and minimum values of f , if any, of the function given by $f(x) = |x|, x \in R$. ▶ Watch Free Video Solution on Doubtnut
153	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 28** Find the maximum and the minimum values, if any, of the function given by $f(x) = x, x \in (0, 1)$ ▶ Watch Free Video Solution on Doubtnut
154	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 29** Find all points of local maxima and local minima of the function f given by $f(x) = x^3 - 3x + 3$. ▶ Watch Free Video Solution on Doubtnut
155	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 30** Find all the points of local maxima and local minima of the function f given by $f(x) = 2x^3 - 6x^2$ $+ 6x + 5$ ▶ Watch Free Video Solution on Doubtnut

NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 31

Find local minimum value of the function f given by
$$f(x) = 3 + |x|, x$$
$$\in R$$
.

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 32

Find local maximum and local minimum values of the function f given by
$$f(x) = 3x^4 + 4x^3$$
$$- 12x^2 + 12$$
.

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 33

Find all the points of local maxima and local minima of the function f given by
$$f(x) = 2x^3 - 6x^2$$
$$+ 6x + 5$$
.

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NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 34

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

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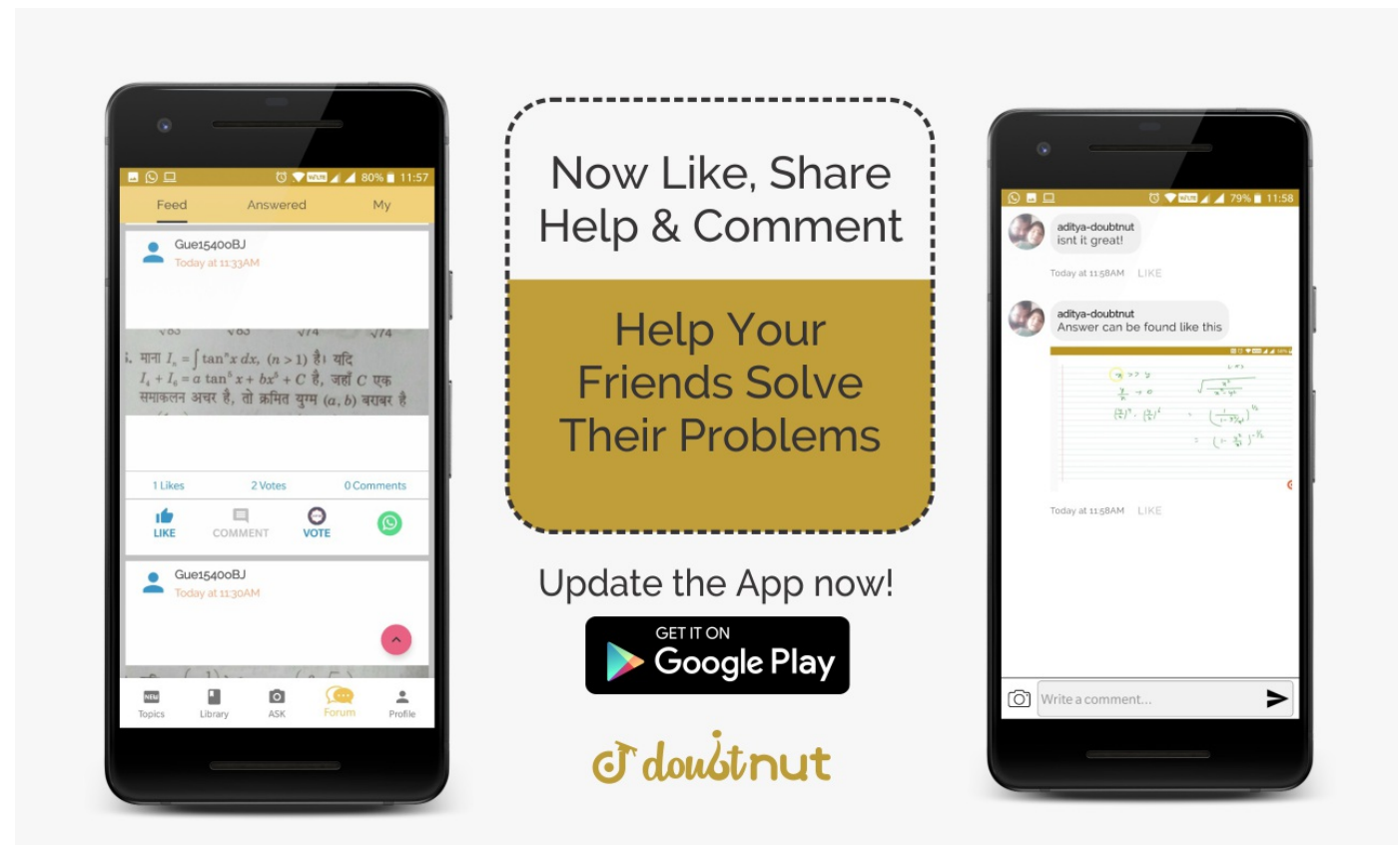|	
160	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 35** Find the shortest distance of the point (0, c) from the parabola $y = x^2$, where $0 \leq c \leq 5$. ► Watch Free Video Solution on Doubtnut
161	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 36** Let AP and BQ be two vertical poles at points A and B, respectively. If $AP = 16 \ m,$ $BQ = 22 \ m \quad and \quad AB = 20 \ m$, then find the distance of a point R on AB from the point A such that $RP^2 + RQ^2$ is minimum. ► Watch Free Video Solution on Doubtnut
162	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 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
163	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 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. ► Watch Free Video Solution on Doubtnut

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164	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 39** Find the absolute maximum and minimum values of a function f given by $f(x) = 2x^3 - 15x^2 + 36x + 1$ on the interval (3.02), $[1, \quad 5]$. ▶ Watch Free Video Solution on Doubtnut
165	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 40** Find absolute maximum and minimum values of a function f given by $f(x) = 12x^{\frac{4}{3}} - 6x^{\frac{1}{3}}$, $x \in [-1, 1]$. ▶ Watch Free Video Solution on Doubtnut
166	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 41** An Apache helicopter of enemy is flying along the curve given by $y = x^2 + 7$. A soldier, placed at (3, 7), wants to shoot down the helicopter when it is nearest to him. Find the nearest distance. ▶ Watch Free Video Solution on Doubtnut
167	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 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 $x = t^2\left(2 - \dfrac{t}{3}\right)$ Find the time taken by it to reach Q and also find distance between P and Q. ▶ Watch Free Video Solution on Doubtnut
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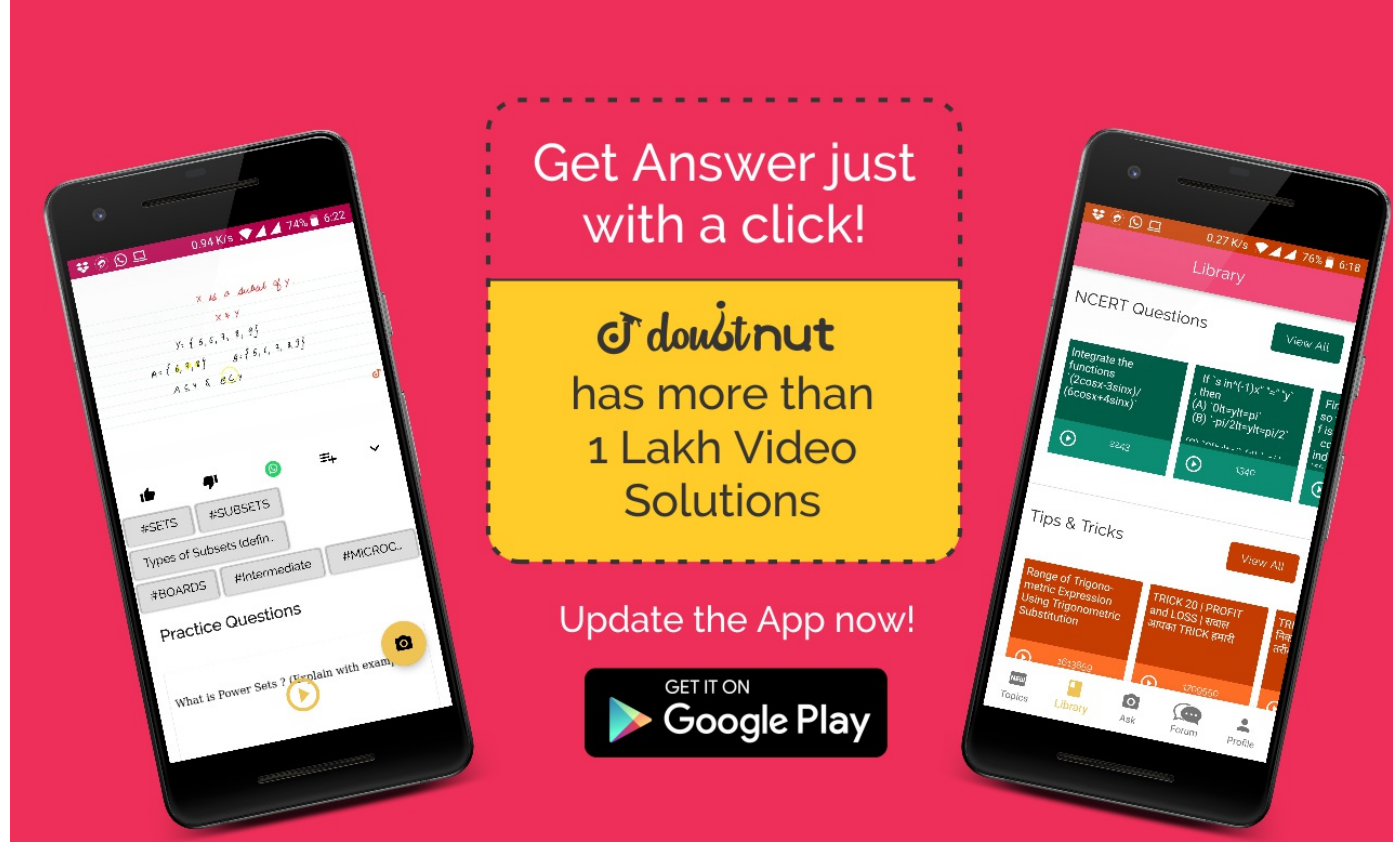
168	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 43** A water tank has the shape of an inverted right circular cone with its axis vertical and vertex lowermost. Its semi-vertical angle is $\tan^{-1}(0.5)$. Water is poured into it at a constant rate of 5 cubic metre 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. ▶ Watch Free Video Solution on Doubtnut
169	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 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. ▶ Watch Free Video Solution on Doubtnut
170	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 45** Find the equation of the normal to the curve $x^2 = 4y$ which passes through the point (1, 2). ▶ Watch Free Video Solution on Doubtnut
171	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 46** Find the equation of tangents to the curve $y = \cos(x + y)$, $-2\pi \le x \le 2\pi$ that are parallel to the line $x + 2y = 0$. ▶ Watch Free Video Solution on Doubtnut

172	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 47** Find intervals in which the function given by $$f(x) = \frac{3}{10}x^4$$ $$-\frac{4}{5}x^3 - 3x^2 + \frac{36}{5}$$ $$+ 11$$ is (a) strictly increasing (b) strictly decreasing. ▶ Watch Free Video Solution on Doubtnut
173	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 48** Show that the function f given by $$f(x)$$ $$= \tan^{-1}(\sin x$$ $$+ \cos x),$$ $$x \quad > \quad 0 \text{ is always an strictly increasing function in } \left(0, \frac{\pi}{4}\right).$$ ▶ Watch Free Video Solution on Doubtnut
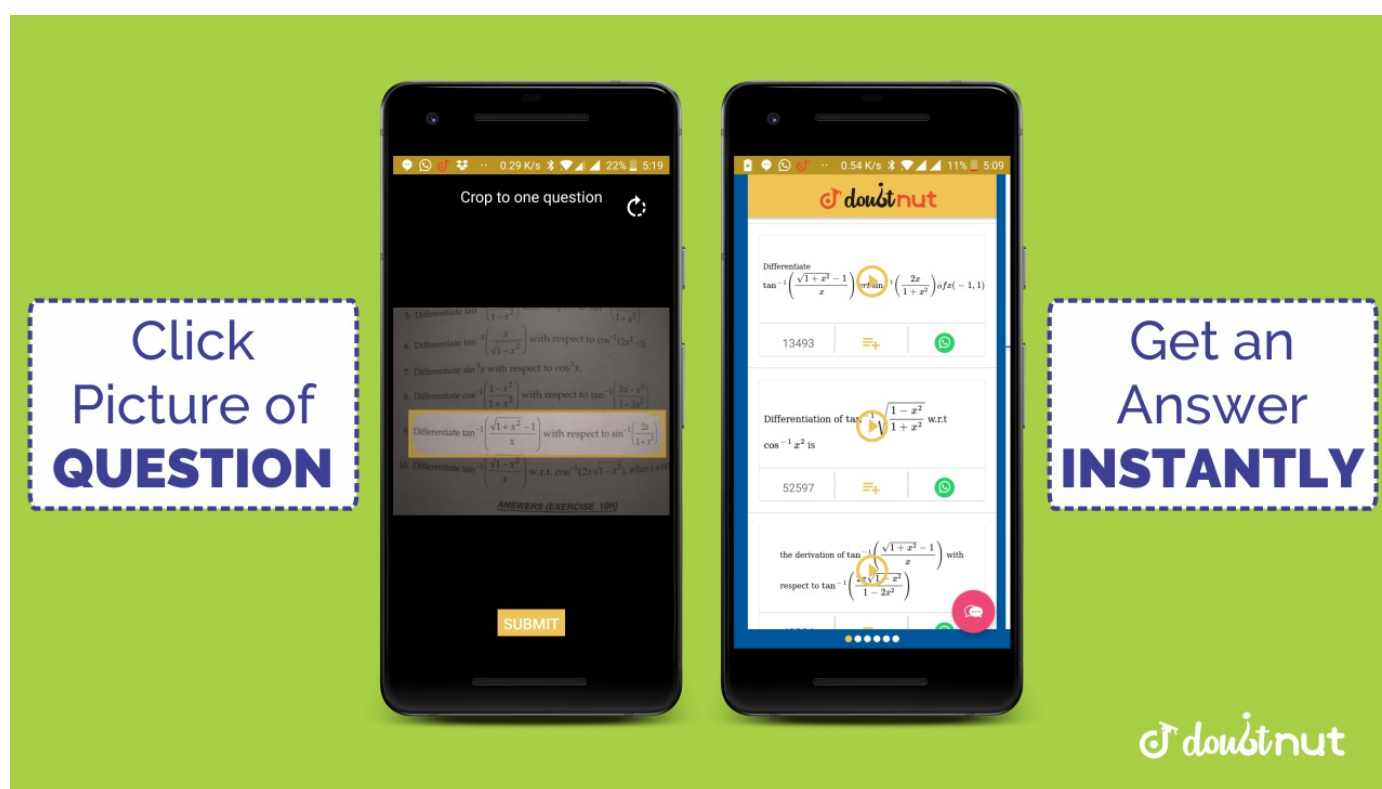
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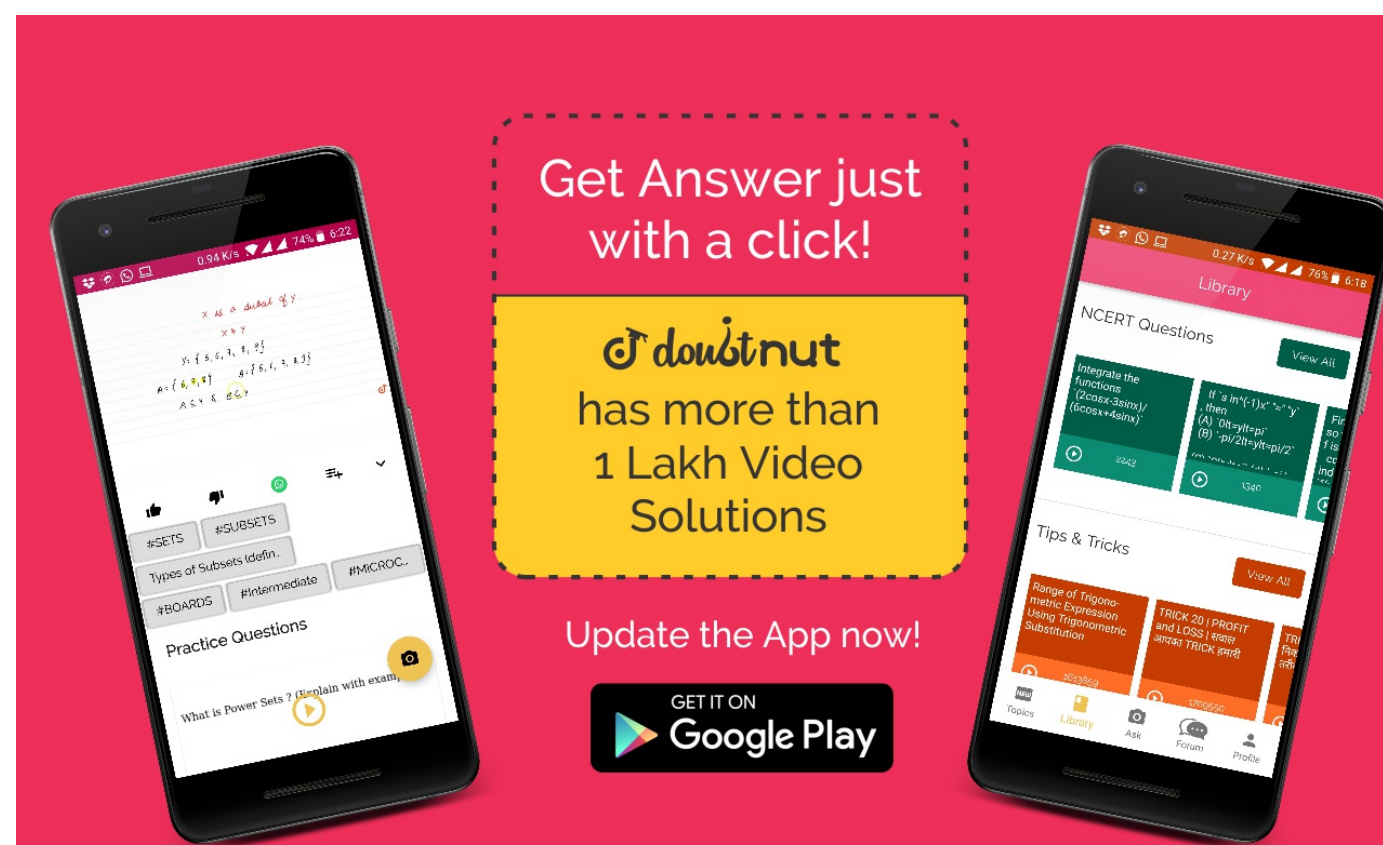|	
174	**EXAMPLES - Q 49** A circular disc of radius 3 cm is being heated. Due to expansion, its radius increases at the rate of 0.05 cm/s. Find the rate at which its area is increasing when radius is 3.2 cm. ▶ Watch Free Video Solution on Doubtnut
175	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 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. ▶ Watch Free Video Solution on Doubtnut
176	**NCERT - CLASS 12 - CHAPTER 6 APPLICATION OF DERIVATIVES - SOLVED EXAMPLES - Q 51** Manufacturer can sell x items at a price of rupees $\left(5 - \dfrac{x}{100}\right)$ each. The cost price of x items is Rs $\left(\dfrac{x}{5} + 500\right)$. Find the number of items he should sell to earn maximum profit ▶ Watch Free Video Solution on Doubtnut