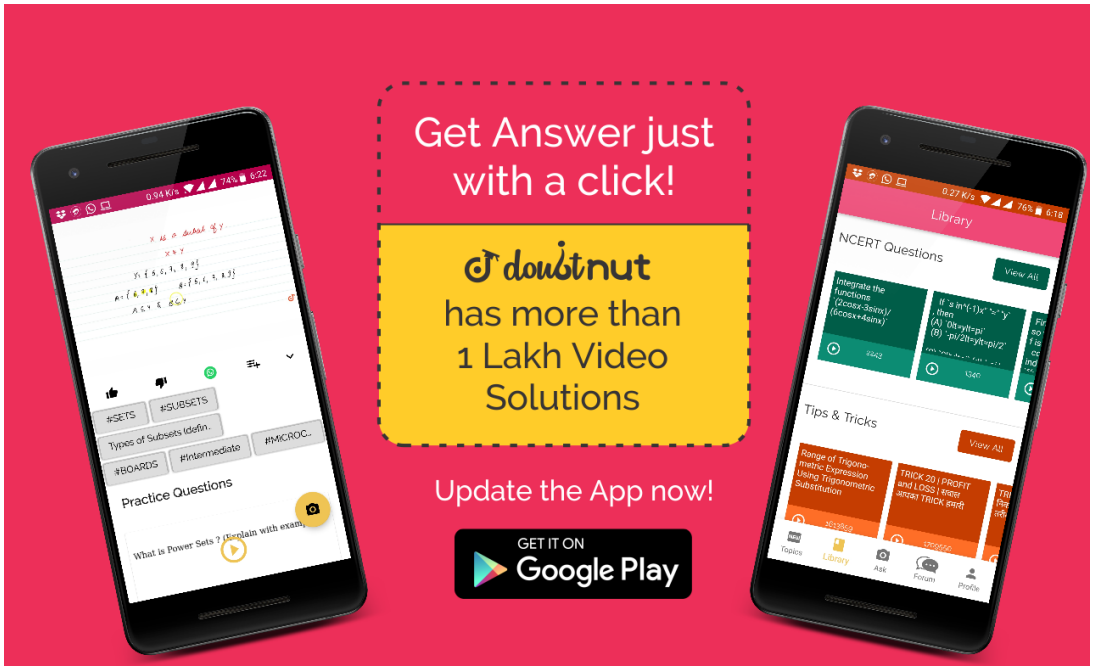
Ques No.	Question
1 - 10413	CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY Verify Rolle's theorem for the function on $f(x) = x^2 - 5x + 6$ on [2, 3]. Click to watch Free Video Solution of this question on Doubtnut
2 - 10416	CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY Find the derivative of $\cos(2x + 1)$ w.r.t. x from first principle. Click to watch Free Video Solution of this question on Doubtnut
3 - 10418	CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY Find the value of k for which the function $f(x) = \{kx + 5, \quad \text{if} \quad x \leq 2x - 1, \quad \text{if} \quad x > 2\}$ is continuous at $x = 2$ Click to watch Free Video Solution of this question on Doubtnut



4 - 10487	**CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Differentiate $\sqrt{\tan x}$ $\dot{\text{wrt}}$. x from first principle. Click to watch Free Video Solution of this question on Doubtnut
5 - 10488	**CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Evaluate: $\left(\lim\right)_{x \overrightarrow{\infty}} \sqrt{x^2+x+1}-x$ Click to watch Free Video Solution of this question on Doubtnut
6 - 10504	**CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Differentiate with $\left(x^2+1\right)$ respect to x from first principle. Click to watch Free Video Solution of this question on Doubtnut
7 - 10509	**CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Verify Rolle's theorem for the function $f(x)=x^2-5x+4$ on [1, 4]. Click to watch Free Video Solution of this question on Doubtnut
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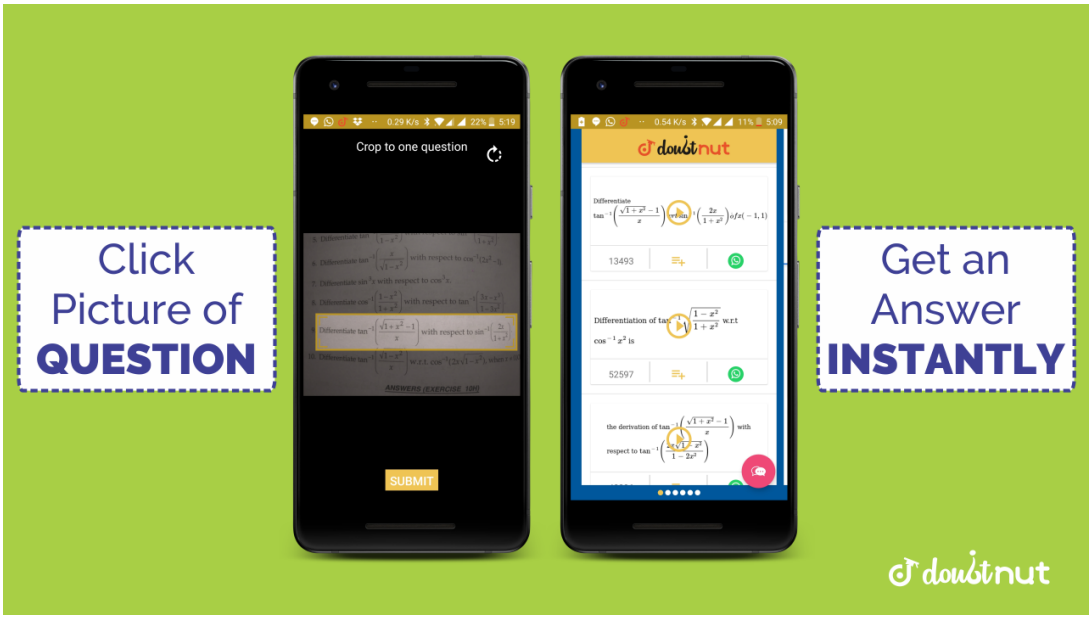

8 - 10533

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Verify Lagranges mean value theorem for the following function:

$$\mathrm{f(x)} = \quad \mathrm{x}^2 + 2x+3, for [4, 6].$$

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9 - 10534

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Discuss the continuity of the following function at x = 0 :

$$\mathrm{f(x)} = \left\{ \frac{\mathrm{x}^4 + 2x^3 + x^2}{\tan^{-1} x}, x \neq 0 \text{ and } 0, x = 0 \right\}$$

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10 - 10569

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Differentiate the following with respect of

$$x : \tan^{-1} \left(\frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}} \right)$$

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11 - 10570

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

For what value of k is the following function continuous at $x = 2$?

$$f(x) = \{2x + 1; x < 2k; x = 23x - 1; x > 2\}$$

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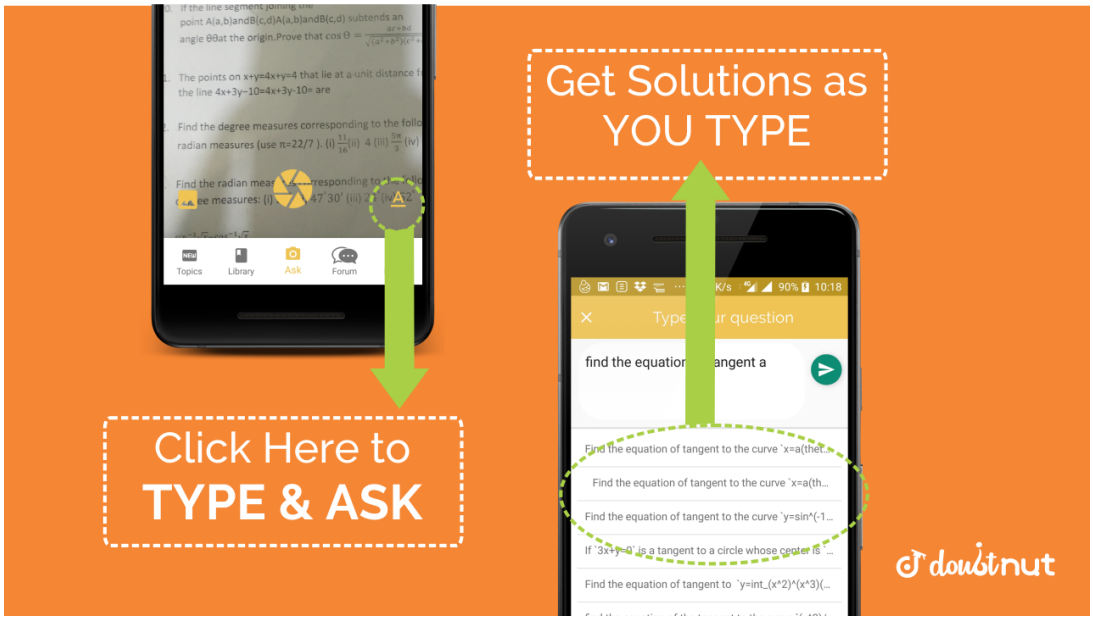

12 - 10631

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Show that the function $f(x) = |x - 3|,\ x \in \ | R,$ is continuous but not differentiable at $x = 3.$

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13 - 10638

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $x = a \sin t$ and $y = a\left(\cos t + \frac{\log \tan t}{2}\right)$, find $\frac{d^2 y}{dx^2}$

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14 - 10689

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Differentiate the following function w.r.t. x: $x^{\sin x} + (\sin x)^{\cos x}$

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15 - 10699

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $\sin y = \sin(a + y)$, prove that $\frac{dy}{dx} = \frac{\sin^2 (a + y)}{\sin a}$

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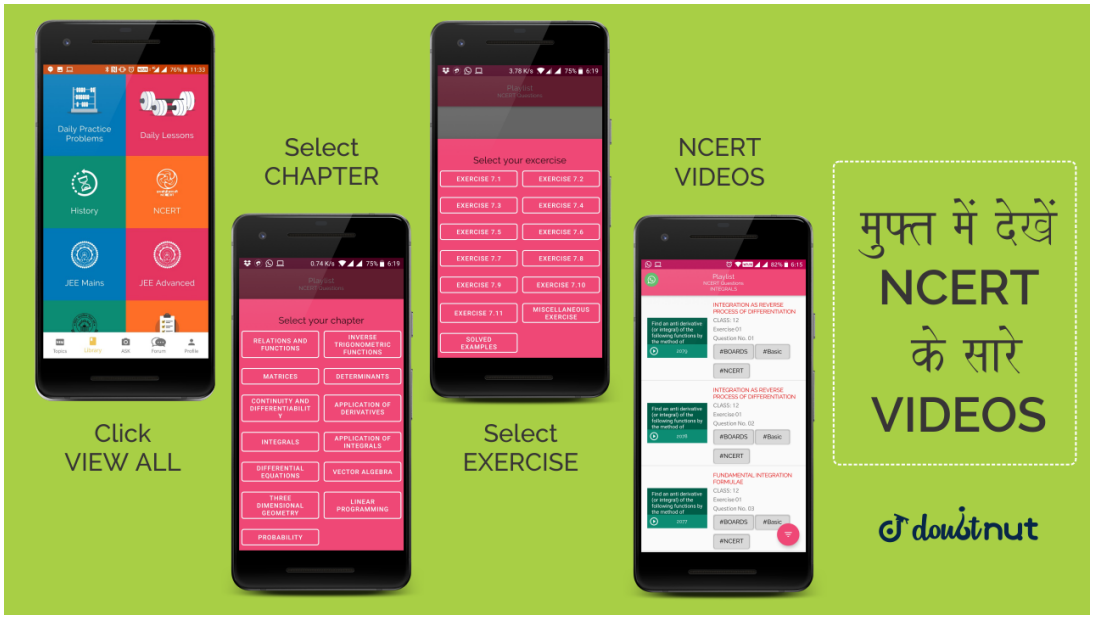

16 - 10700

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $(\cos x)^y = (\sin y)^x$, find $\frac{dy}{dx}$

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17 - 10724

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Find the relationship between a and b so that the function f defined by: $f(x) = \{ax + 1 bx + 3 \quad \text{if } x \leq 3 \text{if } x > 3$

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18 - 10805

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Differentiate the following with respect to x: $\sin^{-1}\left(\frac{2^{x+1}.3^x}{1+(36)^x}\right)$

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19 - 10806

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $y^x = e^{y-x}$, prove that $\frac{dy}{dx} = \frac{(1+\log y)^2}{\log y}$

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20 - 10833	**CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Find $\frac{dy}{dx}$ if $\left(x^2+y^2\right)^2=xy$ Click to watch Free Video Solution of this question on Doubtnut
21 - 10835	**CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $x^m y^n=(x+y)^{m+n}$, prove that $\frac{dy}{dx}=\frac{y}{x}$. Click to watch Free Video Solution of this question on Doubtnut
22 - 10848	**CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Find $\frac{dy}{dx}$, if $y=\sin^{-1}\left[x\sqrt{1-x}-\sqrt{x}\sqrt{1-x^2}\right]$ Click to watch Free Video Solution of this question on Doubtnut
23 - 10849	**CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Show that the function f defined as follows, is continuous at $x=2$, but not differentiable: $f(x)=\{3x-22x^25x$ `02\ ` Click to watch Free Video Solution of this question on Doubtnut
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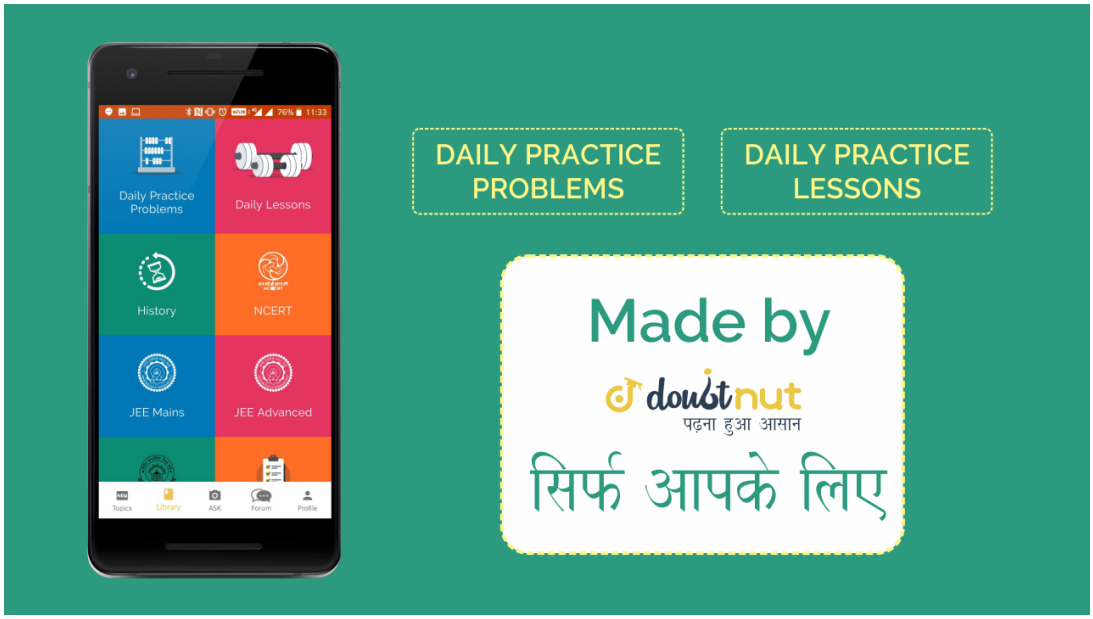
24 - 10883	**CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $x = \tan\left(\frac{1}{a}\log y\right)$, show that $(1-x^2)\frac{d^2y}{dx^2} + (2x-a)\frac{dy}{dx} = 0$ Click to watch Free Video Solution of this question on Doubtnut
25 - 10893	**CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $y = \frac{s \in^{-1} x}{\sqrt{1-x^2}}$, show that $(1-x^2)$ $\frac{d^2y}{dx^2} - 3x\frac{dy}{dx} - y = 0$ Click to watch Free Video Solution of this question on Doubtnut
26 - 10905	**CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $y = \cos^{-1}\left(\frac{3x + 4\sqrt{1-x^2}}{5}\right)$, find $\frac{dy}{dx}$ Click to watch Free Video Solution of this question on Doubtnut
27 - 10907	**CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $y = e^a \sin^{(-1_x)}$, $-1 \leq x \leq 1$, then show that $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} - a^2y = 0$ Click to watch Free Video Solution of this question on Doubtnut



28 - 10923

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Differentiate $x^{x\cos x}+\frac{x^2+1}{x^2-1}\ wrt\ x$

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29 - 10924

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $x=a\left(\theta-\sin\theta\right),\ y=a\left(1+\cos\theta\right),$ find $\frac{d^2y}{dx^2}$

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30 - 10930

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $y=\log\left[x+\sqrt{x^2+1}\right]$, prove that

$$\left(x^2+1\right)\frac{d^2y}{dx^2}+x\frac{dy}{dx}=0$$

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31 - 10931

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Prove that: $\frac{d}{dx}\left[\frac{x}{2}\sqrt{a^2-x^2}+\frac{a^2}{2}\sin^{-1}\left(\frac{x}{a}\right)\right]=\sqrt{a^2-x^2}$

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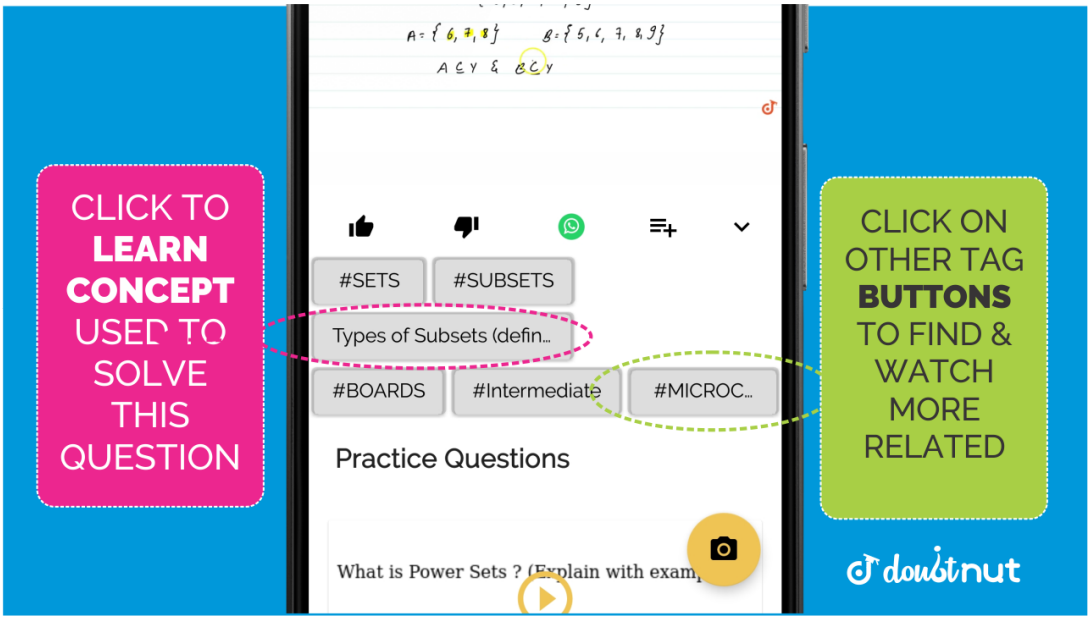

32 - 10934

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Show that the function $f(x) = 2x - |x|$ is continuous but not differentiable at $x = 0$

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33 - 10935

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Differentiate $\tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$ with respect to $\tan^{-1} x$, when $x \neq 0$.

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34 - 10948

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Find the value of $'a'$ for which the function f defined as

$f(x) = \begin{cases} a\frac{\sin \pi}{2}(x+1), & \\ \frac{\tan x - \sin x}{x^3}, & x \leq x > 0 \end{cases}$ is continuous at $x = 0$

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35 - 10973

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Differentiate the following with respect to x: $x^{\sin x} + (\sin x)^{\cos x}$

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36 - 11006

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Find the value of k so that the function f defined by

$$f(x) = \begin{cases} \frac{k\cos x}{\pi - 2x}, 3 & , \quad \text{if } x \neq \frac{\pi}{2} \text{if } x = \frac{\pi}{2} \end{cases} \text{ is}$$

continuous at $x = \frac{\pi}{2}$

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37 - 11020

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Differentiate the following function with respect to x:

$(\log \backslash \mathrm{x})^x + x^{\log x}$

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38 - 11021

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $y = \log\left[x + \sqrt{x^2 + a^2}\right]$, show that (

$$\left(x^2 + a^2\right)\frac{d^2 y}{dx^2} + x\frac{dy}{dx} = 0$$

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39 - 11031

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $x = a^{s} \in^{(-1)} t,\ y = a^{\cos} \hat{} ((-1))t,$ show that $\frac{dy}{dx} = -\frac{y}{x}$

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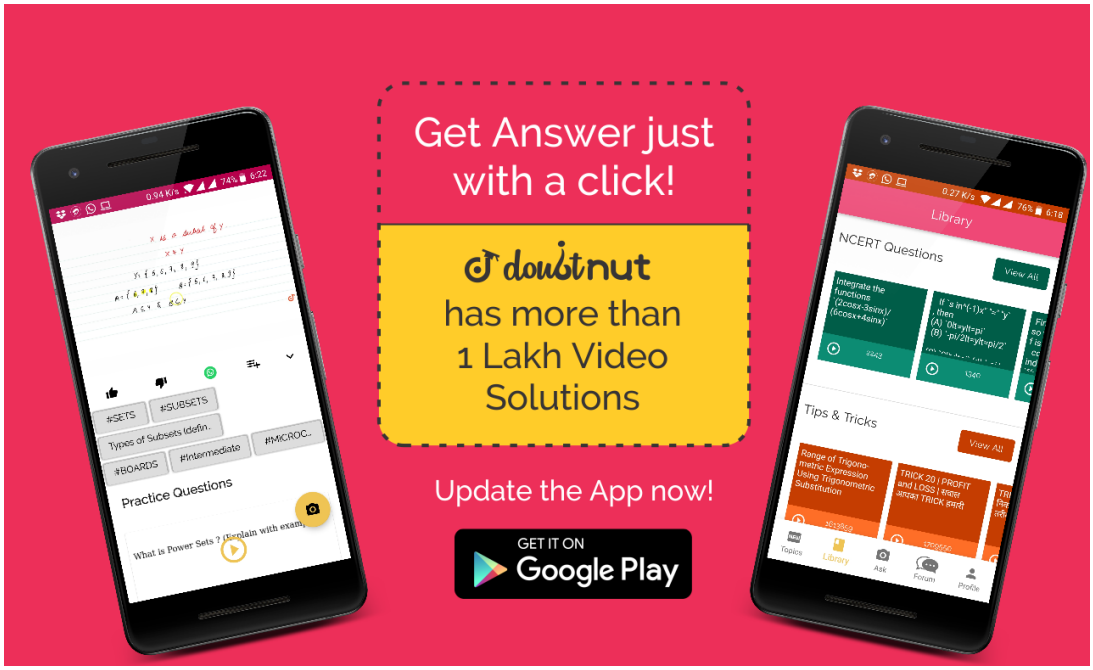

40 - 11045

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $x = a(\cos t + t\ s \in\ t)$ and $y = a\ (\sin t - t\cos t),$ then find $\frac{d^2\ y}{dx^2}$.

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41 - 11049

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $\log\ (x^2 + y^2) = tan^{-1}\left(\frac{y}{x}\right),$ then show that $\frac{dy}{dx} = \frac{x+y}{x-y}$

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42 - 11063

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $x = a\cos^3\theta$ and $y = a\sin^3\theta,$ then find the value of $\frac{d^2y}{dx^2}$ at $\theta = \frac{\pi}{6}$.

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43 - 11064

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $y = \sin(\log x)$, then prove that $\frac{x^2 d^2y}{dx^2} + x\frac{dy}{dx} + y = 0$

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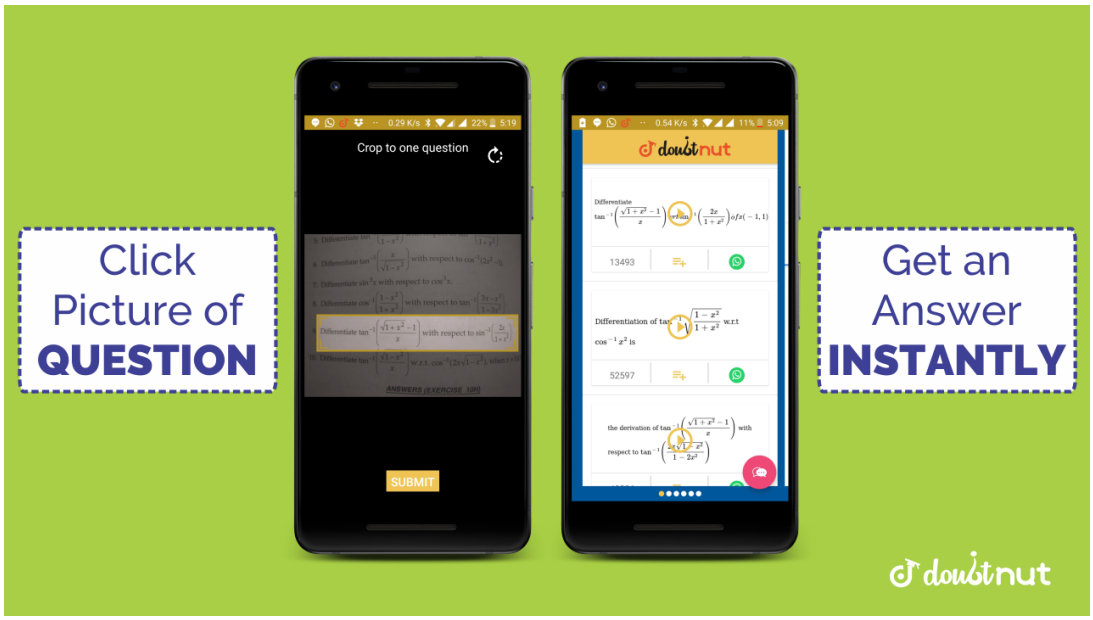

44 - 11065

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Find the value of k, for which

$$f(x) = \begin{cases} \dfrac{\sqrt{1+kx} - \sqrt{1-kx}}{x\frac{2x+1}{x-1}}, & \text{if, } -1 \le x < 0 \text{if } 0 \le x < 1 \end{cases}$$

is continuous at $x = 0$

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45 - 11092

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $(\cos x)^y = (\cos y)^x$, find $\frac{dy}{dx}$

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46 - 11094

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Differentiate $\tan^{-1}\left[\frac{\sqrt{1+x^2}-1}{x}\right]$ with respect to x

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47 - 13243

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $y = \tan^{-1}\left(\frac{a}{x}\right) + \log\sqrt{\frac{x-a}{x+a}}$, Prove that $\frac{dy}{dx} = \frac{2a^3}{x^4 - a^4}$

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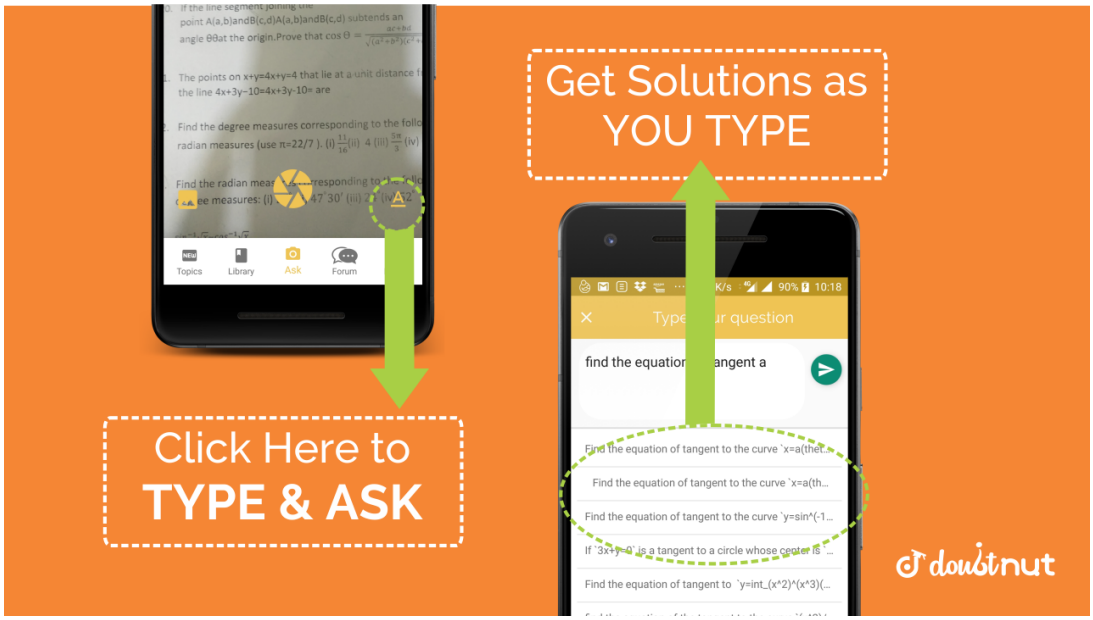

48 - 13244

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Find the value of the constant k so that the function f , defined below, is continuous at $x = 0$, where

$$f(x) = \begin{cases} \left(\frac{1-\cos 4x}{8x^2}\right) k & \text{if } x \neq \\ \text{if } x = 0 \end{cases}$$

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49 - 13249

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Differentiate $\tan^{-1}\left(\frac{\sqrt{1-x^2}}{x}\right)$ with respect to $\cos^{-1}\left(2x\sqrt{1-x^2}\right)$, when $x \neq 0$.

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50 - 13284

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Write the derivative of $\sin x$ w.r.t. $\cos x$.

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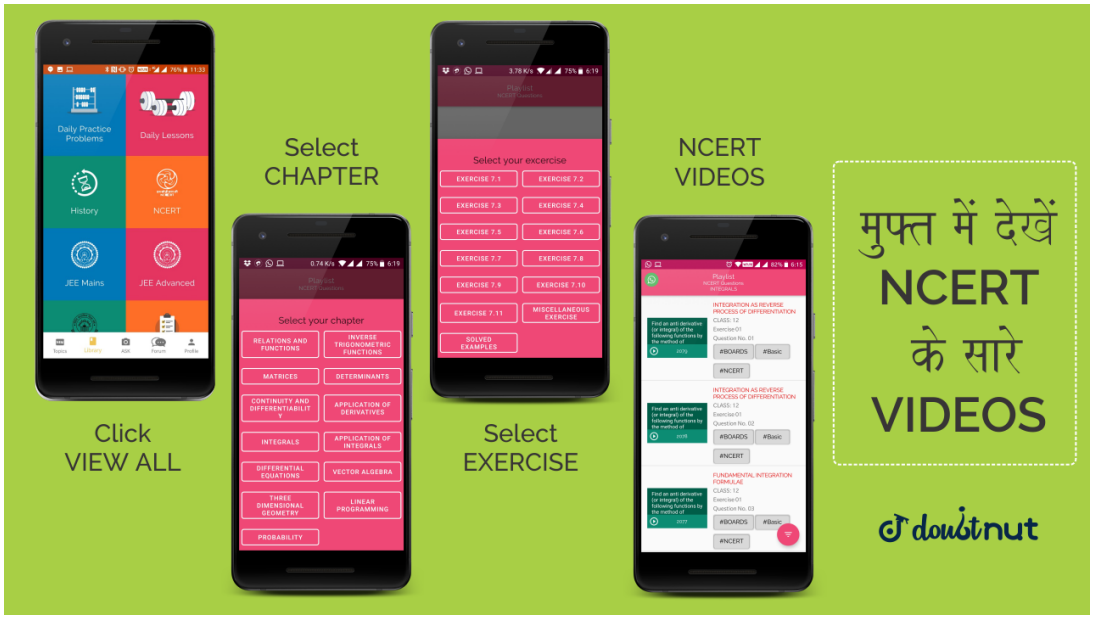
51 - 13298	CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY If $x = a(\cos t + t \sin t) and$ y=a (sin t - t cos t), then find the value of $\frac{d^2y}{dx^2}$ at $t = \frac{\pi}{4}$. Click to watch Free Video Solution of this question on Doubtnut
doubtnut पढ़ना हुआ आसान	
52 - 13299	CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY If $(x-y)e^{\frac{x}{x-y}} = a,$ Prove that $y\frac{dy}{dx} + x = 2y.$ Click to watch Free Video Solution of this question on Doubtnut
53 - 13331	CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY $x = a\cos\theta + b\sin\theta$ and $y = a\sin\theta - b\cos\theta,$ show that $y^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + y = 0$ Click to watch Free Video Solution of this question on Doubtnut
54 - 13332	CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY If $x^m y^n = (x+y)^{m+n},$ Prove that $\frac{dy}{dx} = \frac{y}{x}.$ Click to watch Free Video Solution of this question on Doubtnut
55 - 13361	CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $y = Ae^{mx} + Be^{nx}$, show that

$$\frac{d^2y}{dx^2} - \frac{(m+n)dy}{dx} + mny = 0.$$

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56 - 13364

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

For what value of λ the function defined by

$$f(x) = \{\lambda(x^2+2), \quad \text{if} \quad x \leq 04x+6, \quad \text{if} \quad x0 \text{ is continuous}$$

at $x = 0$? Hence check the differentiability of $f(x)$ at $x = 0$.

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57 - 13365

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $x = ae^t(\sin t + \cos t)$ and $y = ae^t(\sin t - \cos t)$, prove that

$$\frac{dy}{dx} = \frac{x+y}{x-y}.$$

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58 - 13392

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Find the derivative of $(\sin x)^x + \sin^{-1}\sqrt{x}$ w.r.t. x

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59 - 13393

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $y = \frac{x \cos^{-1} x}{\sqrt{1-x^2}} - \log \sqrt{1-x^2}$, then prove that $\frac{dy}{dx} = \frac{co^{-1}x}{(1-x^2)^{\frac{3}{2}}}$

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60 - 13395

CLASS 12 BOARDS: MOST IMPORTANT QUESTIONS - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $x = a \sec^3 \theta, y = a \tan^3 \theta$, find $\frac{d^2y}{dx^2}$ at $\theta = \frac{\pi}{4}$

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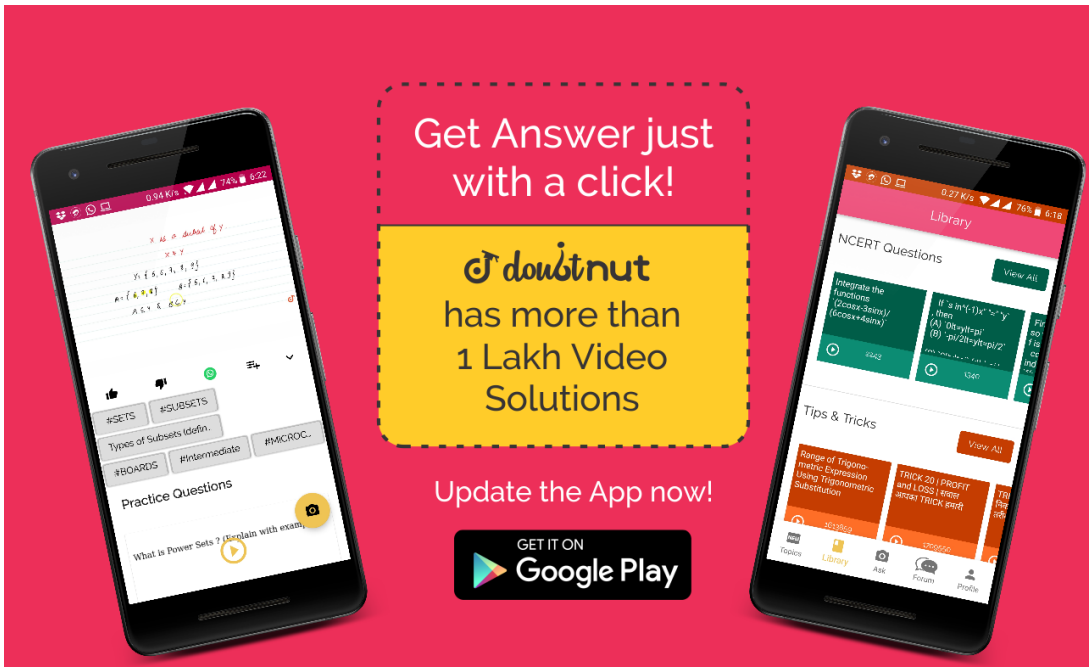
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