

CLASS 12 PRE-BOARDS SPECIAL

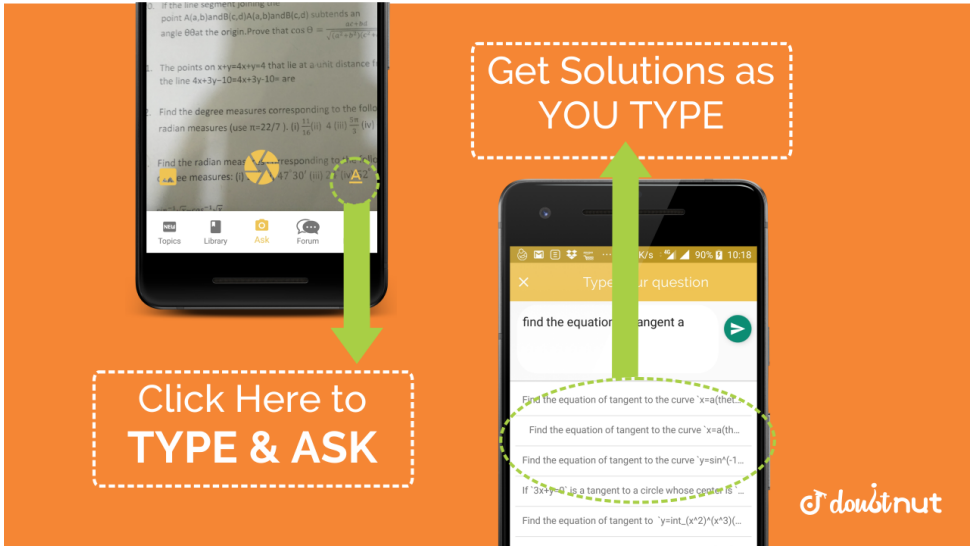



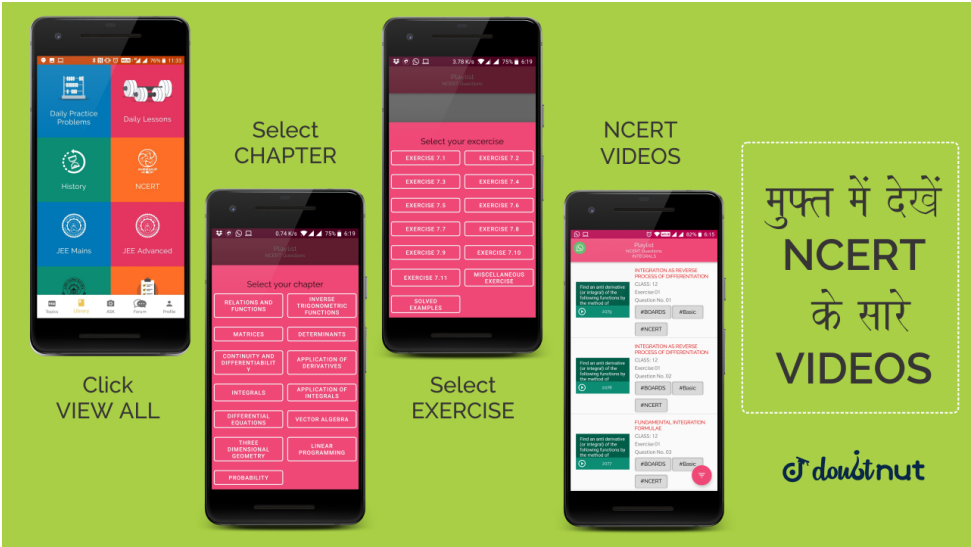
Chapter 5. CONTINUITY AND DIFFERENTIABILITY


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Ques No.	Question
1 - 10413	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Verify Rolle's theorem for the function on $f(x) = x^2 - 5x + 6$ on $[2, 3]$.</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
2 - 10416	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Find the derivative of $\cos(2x + 1)$ w.r.t. x from first principle.</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
3 - 10418	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Find the value of k for which the function $f(x) = \begin{cases} kx + 5, & \text{if } x \leq 2 \\ 2x - 1, & \text{if } x > 2 \end{cases}$ is continuous at $x = 2$</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
4 - 10487	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p>

	<p>Differentiate $\sqrt{\tan x}$ wrt x from first principle.</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
5 - 10488	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Evaluate: $(\lim)_{x \rightarrow \infty} \sqrt{x^2 + x + 1} - x$</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
6 - 10504	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Differentiate with $(x^2 + 1)$ respect to x from first principle.</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
7 - 10509	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Verify Rolle's theorem for the function $f(x) = x^2 - 5x + 4$ on $[1, 4]$.</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
 <p>पढ़ना हुआ आसान</p>	
8 - 10533	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Verify Lagranges mean value theorem for the following function: $f(x) = x^2 + 2x + 3, \text{ for } [4, 6]$.</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
9 - 10534	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p>

	<p>Discuss the continuity of the following function at $x = 0$:</p> $f(x) = \begin{cases} \frac{x^4 + 2x^3 + x^2}{\tan^{-1} x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$ <p>Click to watch Free Video Solution of this question on Doubtnut</p>
10 - 10569	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Differentiate the following with respect of x : $\tan^{-1} \left(\frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}} \right)$</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
11 - 10570	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>For what value of k is the following function continuous at $x = 2$?</p> $f(x) = \begin{cases} 2x + 1; & x < 2k \\ 23x - 1; & x > 2 \end{cases}$ <p>Click to watch Free Video Solution of this question on Doubtnut</p>
	
12 - 10631	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Show that the function $f(x) = x - 3$, $x \in \mathbb{R}$, is continuous but not differentiable at $x = 3$.</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
13 - 10638	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>If $x = a \sin t$ and $y = a \left(\cos t + \frac{\log \tan t}{2} \right)$, find $\frac{d^2 y}{dx^2}$</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>

14 - 10689	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Differentiate the following function w.r.t. x: $x^{\sin x} + (\sin x)^{\cos x}$</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
15 - 10699	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>If $\sin y = \sin(a + y)$, prove that $\frac{dy}{dx} = \frac{\sin^2(a + y)}{\sin a}$</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
 <p>पढ़ना हुआ आसान</p>	 <p>The image shows four smartphones displaying the DoubtNut app interface. The first phone shows the home screen with icons for Daily Practice Problems, Daily Lessons, History, NCERT, JEE Mains, and JEE Advanced. The second phone shows the 'Select CHAPTER' screen with a list of chapters including Relations and Functions, Trigonometric Functions, Matrices, Determinants, Continuity and Differentiability, Application of Derivatives, Integrals, Application of Integrals, Differential Equations, Vector Algebra, Three Dimensional Geometry, Linear Programming, and Probability. The third phone shows the 'Select your exercise' screen with a list of exercises from 7.1 to 7.11, along with Miscellaneous Exercise and Solve Examples. The fourth phone shows the 'NCERT VIDEOS' screen with a list of videos for Class 12, including Integration and Differentiation, and Fundamental Integration. A text box on the right says 'मुफ्त में देखें NCERT के सारे VIDEOS' (Watch all NCERT videos for free) and the DoubtNut logo is at the bottom right.</p>
16 - 10700	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>If $(\cos x)^y = (\sin y)^x$, find $\frac{dy}{dx}$</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
17 - 10724	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Find the relationship between a and b so that the function f defined by: $f(x) = \begin{cases} ax + 1 & \text{if } x \leq 3 \\ bx + 3 & \text{if } x > 3 \end{cases}$</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
18 - 10805	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Differentiate the following with respect to x: $\sin^{-1}\left(\frac{2^{x+1} \cdot 3^x}{1 + (36)^x}\right)$</p>

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19 - 10806	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>If $y^x = e^{y-x}$, prove that $\frac{dy}{dx} = \frac{(1 + \log y)^2}{\log y}$</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
	
20 - 10833	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Find $\frac{dy}{dx}$ if $(x^2 + y^2)^2 = xy$</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
21 - 10835	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>If $x^m y^n = (x + y)^{m+n}$, prove that $\frac{dy}{dx} = \frac{y}{x}$.</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
22 - 10848	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Find $\frac{dy}{dx}$, if $y = \sin^{-1} \left[x\sqrt{1-x} - \sqrt{x}\sqrt{1-x^2} \right]$</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
23 - 10849	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p>

Show that the function f defined as follows, is continuous at $x = 2$, but not differentiable: $f(x) = \begin{cases} 3x - 22x^2 & x \neq 2 \\ 5 \end{cases}$

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24 - 10883

CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $x = \tan\left(\frac{1}{a} \log y\right)$, show that $(1 - x^2) \frac{d^2 y}{dx^2} + (2x - a) \frac{dy}{dx} = 0$

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25 - 10893

CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $y = \frac{s \in^{-1} x}{\sqrt{1 - x^2}}$, show that $(1 - x^2) \frac{d^2 y}{dx^2} - 3x \frac{dy}{dx} - y = 0$

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26 - 10905

CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $y = \cos^{-1}\left(\frac{3x + 4\sqrt{1 - x^2}}{5}\right)$, find $\frac{dy}{dx}$

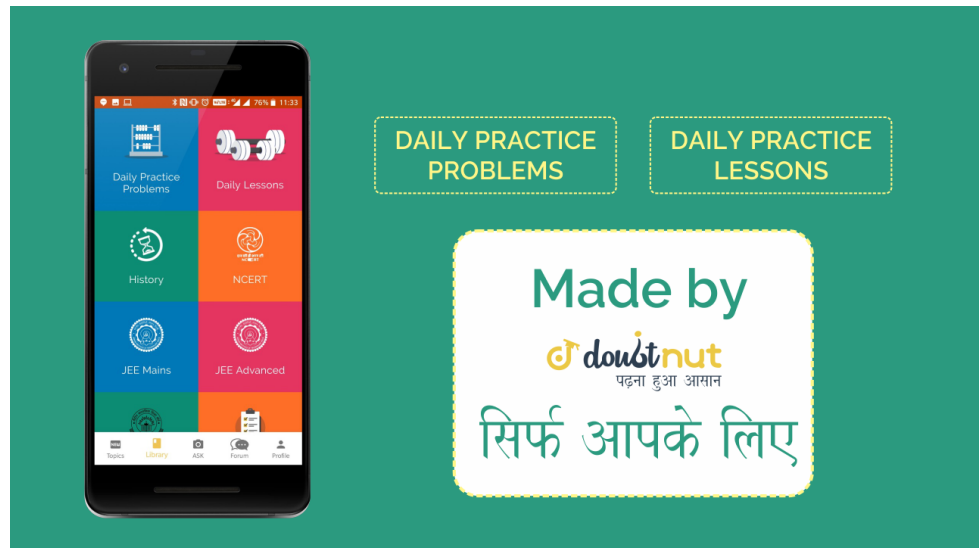
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27 - 10907

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If $y = e^a \sin(-1_x)$, $-1 \leq x \leq 1$, then show that $(1 - x^2) \frac{d^2 y}{dx^2} - x \frac{dy}{dx} - a^2 y = 0$

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28 - 10923

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

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29 - 10924

CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

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

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30 - 10930

CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

If $y = \log \left[x + \sqrt{x^2 + 1} \right]$, prove that $(x^2 + 1) \frac{d^2 y}{dx^2} + x \frac{dy}{dx} = 0$

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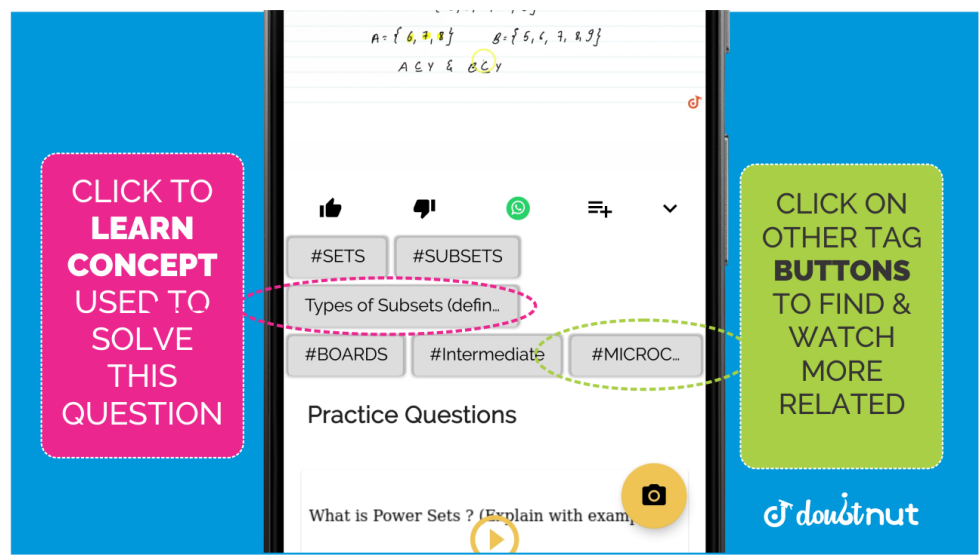
31 - 10931

CLASS 12 PRE-BOARDS SPECIAL - 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 PRE-BOARDS SPECIAL - 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 PRE-BOARDS SPECIAL - 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 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

Find the value of 'a' for which the function f defined as $f(x) = \begin{cases} a \frac{\sin \pi}{2} (x+1), & x \leq 0 \\ \frac{\tan x - \sin x}{x^3}, & x > 0 \end{cases}$ is continuous at $x = 0$

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35 - 10973

CLASS 12 PRE-BOARDS SPECIAL - 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

Find the value of k so that the function f defined by $f(x) = \begin{cases} \frac{k \cos x}{\pi - 2x}, & \text{if } x \neq \frac{\pi}{2} \\ 3, & \text{if } x = \frac{\pi}{2} \end{cases}$ is continuous at $x = \frac{\pi}{2}$

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37 - 11020

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

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38 - 11021

If $y = \log \left[x + \sqrt{x^2 + a^2} \right]$, show that $\left((x^2 + a^2) \frac{d^2 y}{dx^2} + x \frac{dy}{dx} \right) = 0$

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39 - 11031

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

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40 - 11045

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

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41 - 11049

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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CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

42 - 11063

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

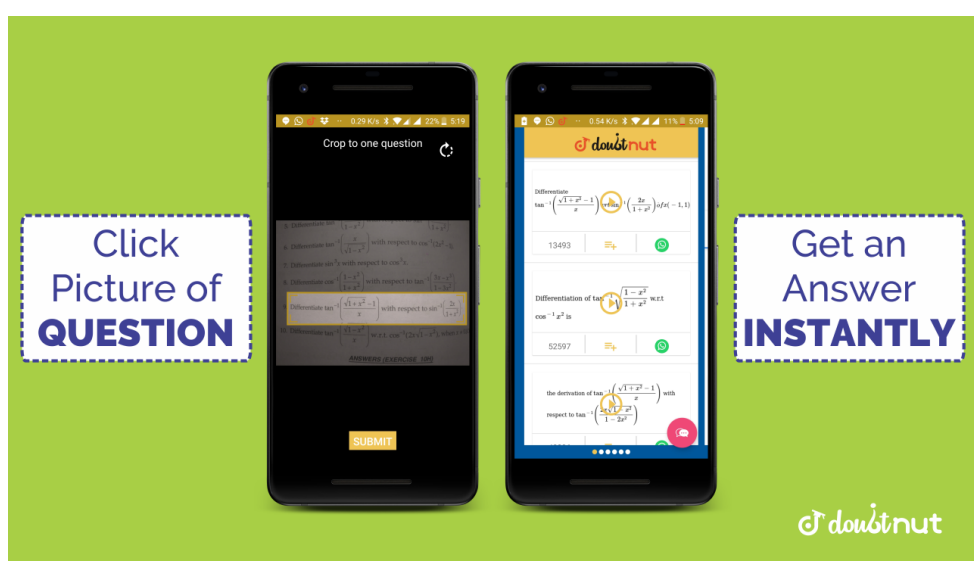
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CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

43 - 11064

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

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<p>44 - 11065</p>	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Find the value of k, for which</p> $f(x) = \begin{cases} \frac{\sqrt{1+kx} - \sqrt{1-kx}}{x \frac{2x+1}{x-1}}, & \text{if } -1 \leq x < 0 \\ \text{if } 0 \leq x < 1 \end{cases}$ <p>is continuous at $x = 0$</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
<p>45 - 11092</p>	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>If $(\cos x)^y = (\cos y)^x$, find $\frac{dy}{dx}$</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
<p>46 - 11094</p>	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>Differentiate $\tan^{-1} \left[\frac{\sqrt{1+x^2} - 1}{x} \right]$ with respect to x</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>
<p>47 - 13243</p>	<p>CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY</p> <p>If $y = \tan^{-1} \left(\frac{a}{x} \right) + \log \sqrt{\frac{x-a}{x+a}}$, Prove that $\frac{dy}{dx} = \frac{2a^3}{x^4 - a^4}$</p> <p>Click to watch Free Video Solution of this question on Doubtnut</p>

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48 - 13244

CLASS 12 PRE-BOARDS SPECIAL - 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 $f(x) = \begin{cases} \left(\frac{1 - \cos 4x}{8x^2}\right)k & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases}$

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49 - 13249

CLASS 12 PRE-BOARDS SPECIAL - 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

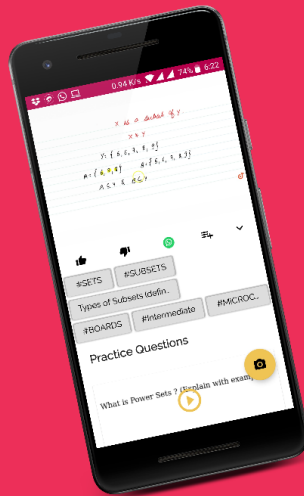
CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY

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

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