CLASS 12 PRE-BOARDS SPECIAL

Chapter 5. CONTINUITY AND DIFFERENTIABILITY

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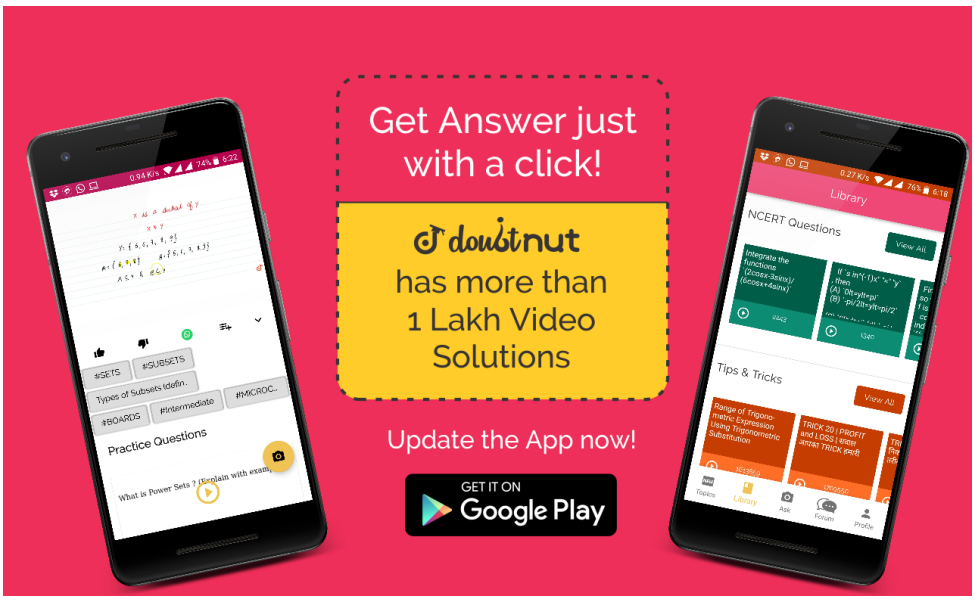
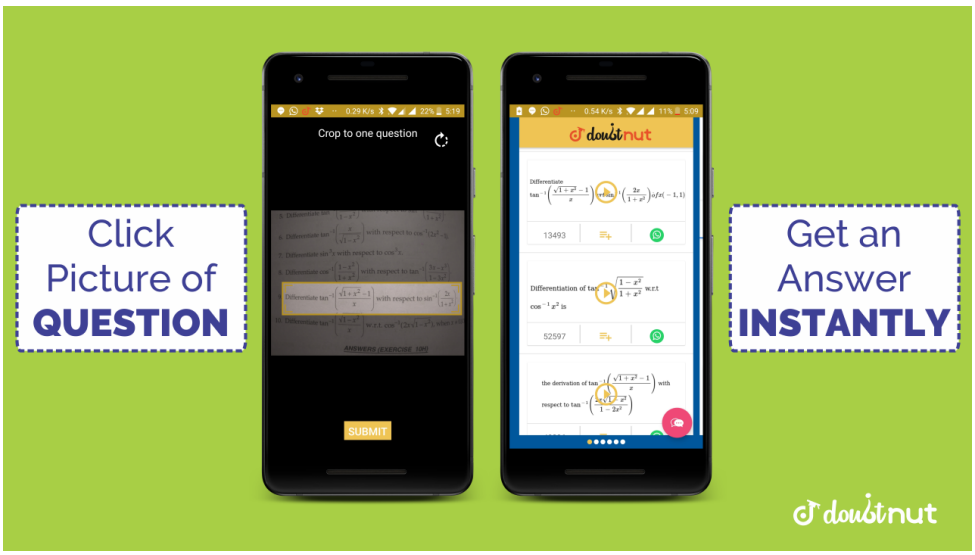
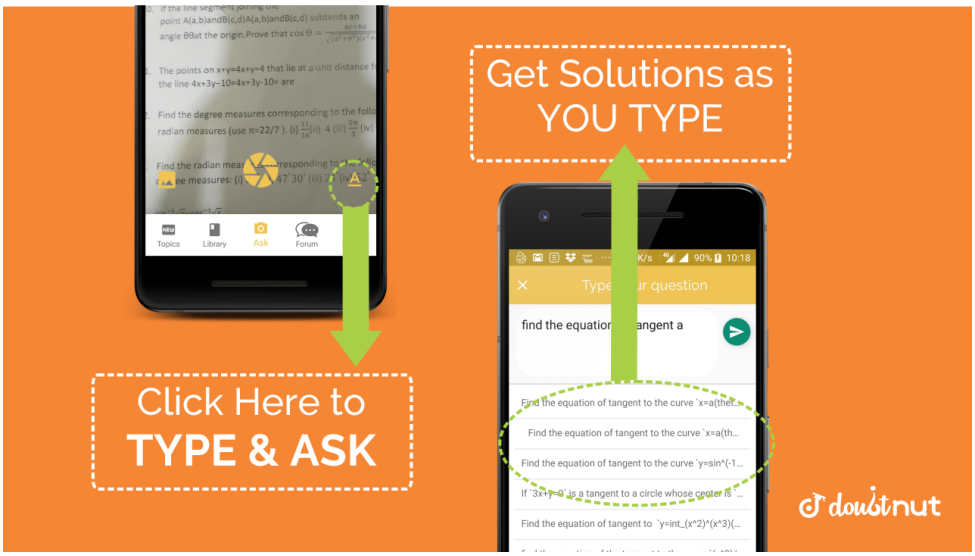
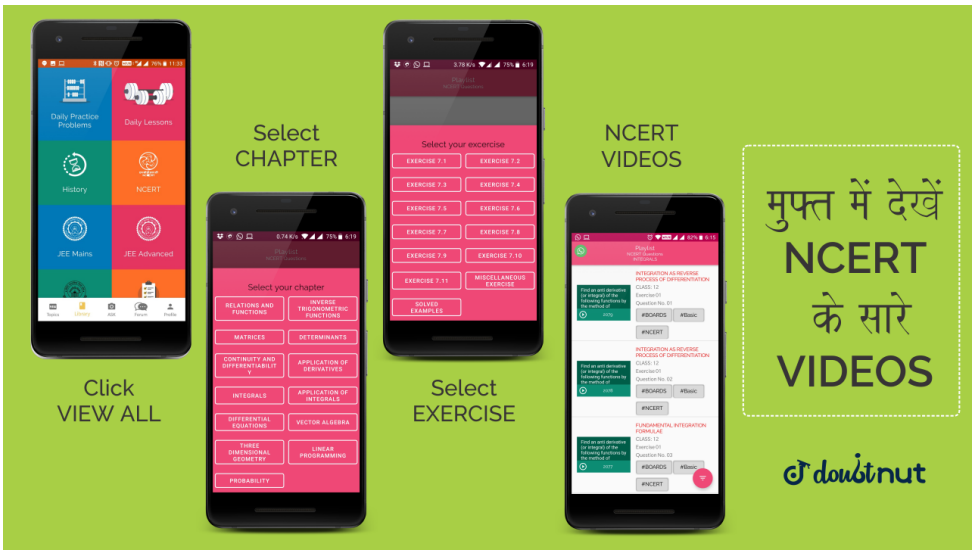
Ques No.	Question
1 - 10413	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Verify Rolle's theorem for the function on $f(x) = x^2 - 5x + 6$ on [2, 3]. Click to watch Free Video Solution of this question on Doubtnut
2 - 10416	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY 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 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Find the value of k for which the function $f(x) = \{kx + 5, \text{ if } x \leq 2x - 1, \text{ if } x > 2\}$ is continuous at $x = 2$ Click to watch Free Video Solution of this question on Doubtnut
	
4 - 10487	**CLASS 12 PRE-BOARDS SPECIAL - 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 PRE-BOARDS SPECIAL - 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 PRE-BOARDS SPECIAL - 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 PRE-BOARDS SPECIAL - 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
doubtnut पढ़ना हुआ आसान	
8 - 10533	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Verify Lagranges mean value theorem for the following function: $\mathrm{f(x)}=\mathrm{x}^2+2x+3, for [4,6]$. Click to watch Free Video Solution of this question on Doubtnut
9 - 10534	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY**

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

14 - 10689	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Differentiate the following function w.r.t. x: $x^{\sin x}+(\sin x)^{\cos x}$ Click to watch Free Video Solution of this question on Doubtnut
15 - 10699	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $\sin y=\sin(a+y)$, prove that $\frac{dy}{dx}=\frac{\sin^2(a+y)}{\sin a}$ Click to watch Free Video Solution of this question on Doubtnut
	
16 - 10700	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $(\cos x)^y=(\sin y)^x$, find $\frac{dy}{dx}$ Click to watch Free Video Solution of this question on Doubtnut
17 - 10724	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Find the relationship between a and b so that the function f defined by: $f(x)=\{ax+1bx+3 \quad \text{if } x \leq 3 \text{if } x>3$ Click to watch Free Video Solution of this question on Doubtnut
18 - 10805	**CLASS 12 PRE-BOARDS SPECIAL - 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 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $y^x = e^{y-x}$, prove that $\frac{dy}{dx} = \frac{(1+\log y)^2}{\log y}$ Click to watch Free Video Solution of this question on Doubtnut
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20 - 10833	**CLASS 12 PRE-BOARDS SPECIAL - 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 PRE-BOARDS SPECIAL - 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 PRE-BOARDS SPECIAL - 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 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY**

	Show that the function f defined as follows, is continuous at $x = 2$, but not differentiable: $f(x) = \{3x - 22x^2 5x$ `02\ ` Click to watch Free Video Solution of this question on Doubtnut
	
24 - 10883	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $x = \tan\left(\frac{1}{a}\log y\right)$, show that $\left(1 - x^2\right)\frac{d^2 y}{dx^2} + (2x - a)\frac{dy}{dx} = 0$ Click to watch Free Video Solution of this question on Doubtnut
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 $\left(1 - x^2\right)\frac{d^2 y}{dx^2} - 3x\frac{dy}{dx} - y = 0$ Click to watch Free Video Solution of this question on Doubtnut
26 - 10905	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $y = \cos^{-1}\left(\frac{3x + 4\sqrt{1 - x^2}}{5}\right), \mathrm{find}\frac{dy}{dx}$ Click to watch Free Video Solution of this question on Doubtnut
27 - 10907	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $y = e^a \sin^{(-1_x)}$, $-1 \leq x \leq 1$, then show that $\left(1 - x^2\right)\frac{d^2 y}{dx^2} - x\frac{dy}{dx} - a^2 y = 0$

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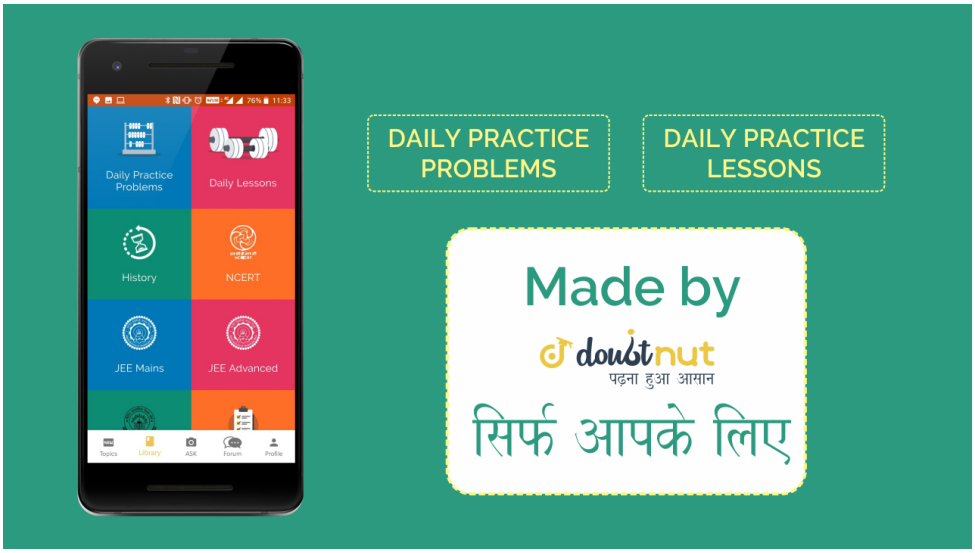
doubtnut पढ़ना हुआ आसान	
28 - 10923	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Differentiate $x^{x\cos x}+\frac{x^2+1}{x^2-1}$ $w\dot{r}t\dot{x}$ Click to watch Free Video Solution of this question on Doubtnut
29 - 10924	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $x=a\,(\theta-\sin\theta),\ y=a\,(1+\cos\theta),$ find $\frac{d^2y}{dx^2}$ Click to watch Free Video Solution of this question on Doubtnut
30 - 10930	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $y=\log\left[x+\sqrt{x^2+1}\right]$, prove that $\left(x^2+1\right)\frac{d^2y}{dx^2}+x\frac{dy}{dx}=0$ Click to watch Free Video Solution of this question on Doubtnut
31 - 10931	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Prove that: $\frac{d}{dx}\left[\frac{x}{2}\sqrt{a^2-x^2}+\frac{a^2}{2}\sin^{-1}\left(\frac{x}{a}\right)\right]=\sqrt{a^2-x^2}$ Click to watch Free Video Solution of this question on Doubtnut
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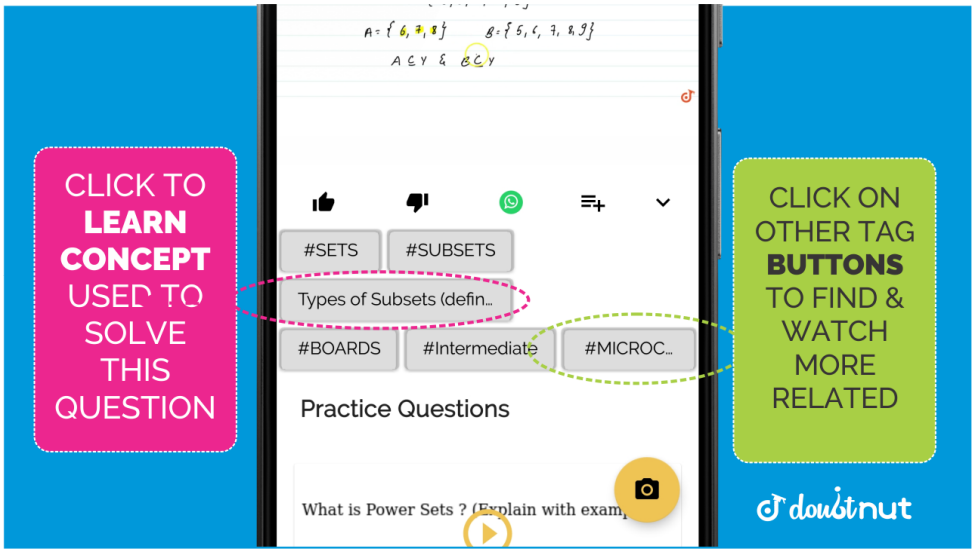

32 - 10934	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Show that the function $f(x) = 2x - \|x\|$ is continuous but not differentiable at $x = 0$ Click to watch Free Video Solution of this question on Doubtnut
33 - 10935	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Differentiate $\tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$ with respect to $\tan^{-1}x$, when $x \neq 0$. Click to watch Free Video Solution of this question on Doubtnut
34 - 10948	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Find the value of $'a'$ for which the function f defined as $f(x) = \begin{cases} a\frac{\sin\pi}{2}(x+1), & x \leq \\ \frac{\tan x - \sin x}{x^3}, & x > 0 \end{cases}$ is continuous at $x = 0$ Click to watch Free Video Solution of this question on Doubtnut
35 - 10973	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Differentiate the following with respect to x: $x^{\sin x} + (\sin x)^{\cos x}$ Click to watch Free Video Solution of this question on Doubtnut
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36 - 11006	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Find the value of k so that the function f defined by $f(x) = \begin{cases} \frac{k\cos x}{\pi - 2x}, 3 & , \quad \text{if } x \neq \frac{\pi}{2} \text{if } x = \frac{\pi}{2} \end{cases}$ is continuous at $x = \frac{\pi}{2}$ Click to watch Free Video Solution of this question on Doubtnut
37 - 11020	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Differentiate the following function with respect to x: $(\log \backslash \mathrm{x})^x + x^{\log x}$ Click to watch Free Video Solution of this question on Doubtnut
38 - 11021	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $y = \log\left[x + \sqrt{x^2 + a^2}\right]$, show that $\left(\left(x^2 + a^2\right)\frac{d^2 y}{dx^2} + x\frac{dy}{dx} = 0\right.$ Click to watch Free Video Solution of this question on Doubtnut
39 - 11031	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $x = a^{s \in^{(-1)}} t,\ y = a^{\cos \hat{}\left(\left(-1\right)\right)t},$ show that $\frac{dy}{dx} = -\frac{y}{x}$ Click to watch Free Video Solution of this question on Doubtnut
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40 - 11045	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $x = a(\cos t + t\ s \in\ t)$ and $y = a\ (\sin t - t\cos t)$, then find $\frac{d^2\ y}{dx^2}$. Click to watch Free Video Solution of this question on Doubtnut
41 - 11049	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $\log\ (x^2 + y^2) = tan^{-1}\ \left(\frac{y}{x}\right)$, then show that $\frac{dy}{dx} = \frac{x+y}{x-y}$ Click to watch Free Video Solution of this question on Doubtnut
42 - 11063	**CLASS 12 PRE-BOARDS SPECIAL - 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 $\theta = \frac{\pi}{6}$. Click to watch Free Video Solution of this question on Doubtnut
43 - 11064	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $y = \sin(\log x)$, then prove that $\frac{x^2d^2y}{dx^2} + x\frac{dy}{dx} + y = 0$ Click to watch Free Video Solution of this question on Doubtnut

44 - 11065	**CLASS 12 PRE-BOARDS SPECIAL - 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 $x = 0$ Click to watch Free Video Solution of this question on Doubtnut
45 - 11092	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $(\cos x)^y = (\cos y)^x$, find $\dfrac{dy}{dx}$ Click to watch Free Video Solution of this question on Doubtnut
46 - 11094	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Differentiate $\tan^{-1}\left[\dfrac{\sqrt{1+x^2}-1}{x}\right]$ with respect to x Click to watch Free Video Solution of this question on Doubtnut
47 - 13243	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** If $y = \tan^{-1}\left(\dfrac{a}{x}\right) + \log\sqrt{\dfrac{x-a}{x+a}}$, Prove that $\dfrac{dy}{dx} = \dfrac{2a^3}{x^4 - a^4}$ Click to watch Free Video Solution of this question on Doubtnut
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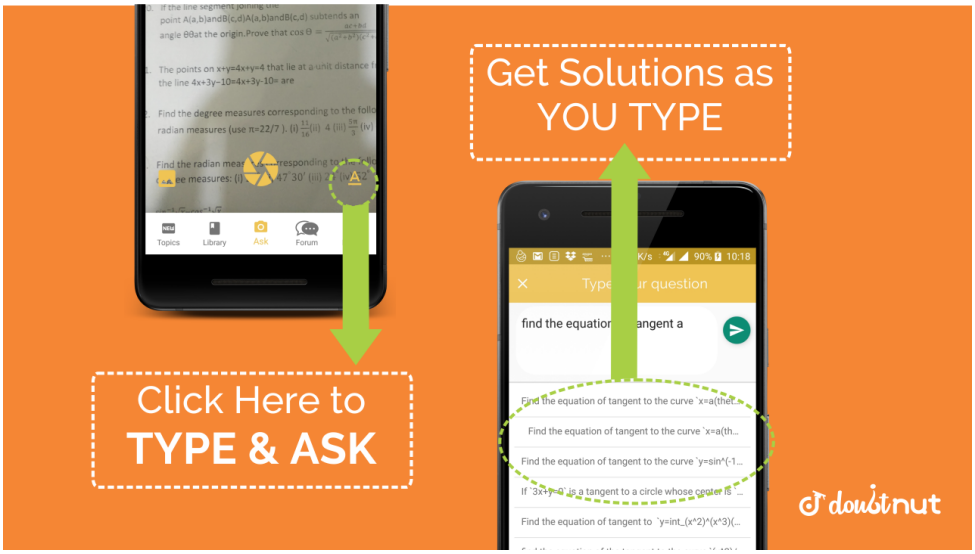

48 - 13244	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Find the value of the constant k so that the function f, defined below, is continuous at $x = 0$, where $f(x) = \begin{cases} \left(\frac{1-\cos 4x}{8x^2}\right) k \text{if} x \neq \text{if} x = 0 \end{cases}$ Click to watch Free Video Solution of this question on Doubtnut
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 $x \neq 0$. Click to watch Free Video Solution of this question on Doubtnut
50 - 13284	**CLASS 12 PRE-BOARDS SPECIAL - Chapter 5. CONTINUITY AND DIFFERENTIABILITY** Write the derivative of $\sin x$ w.r.t. $\cos x$. Click to watch Free Video Solution of this question on Doubtnut
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