JEE MAINS MATHS SOLUTIONS

YEAR 2009

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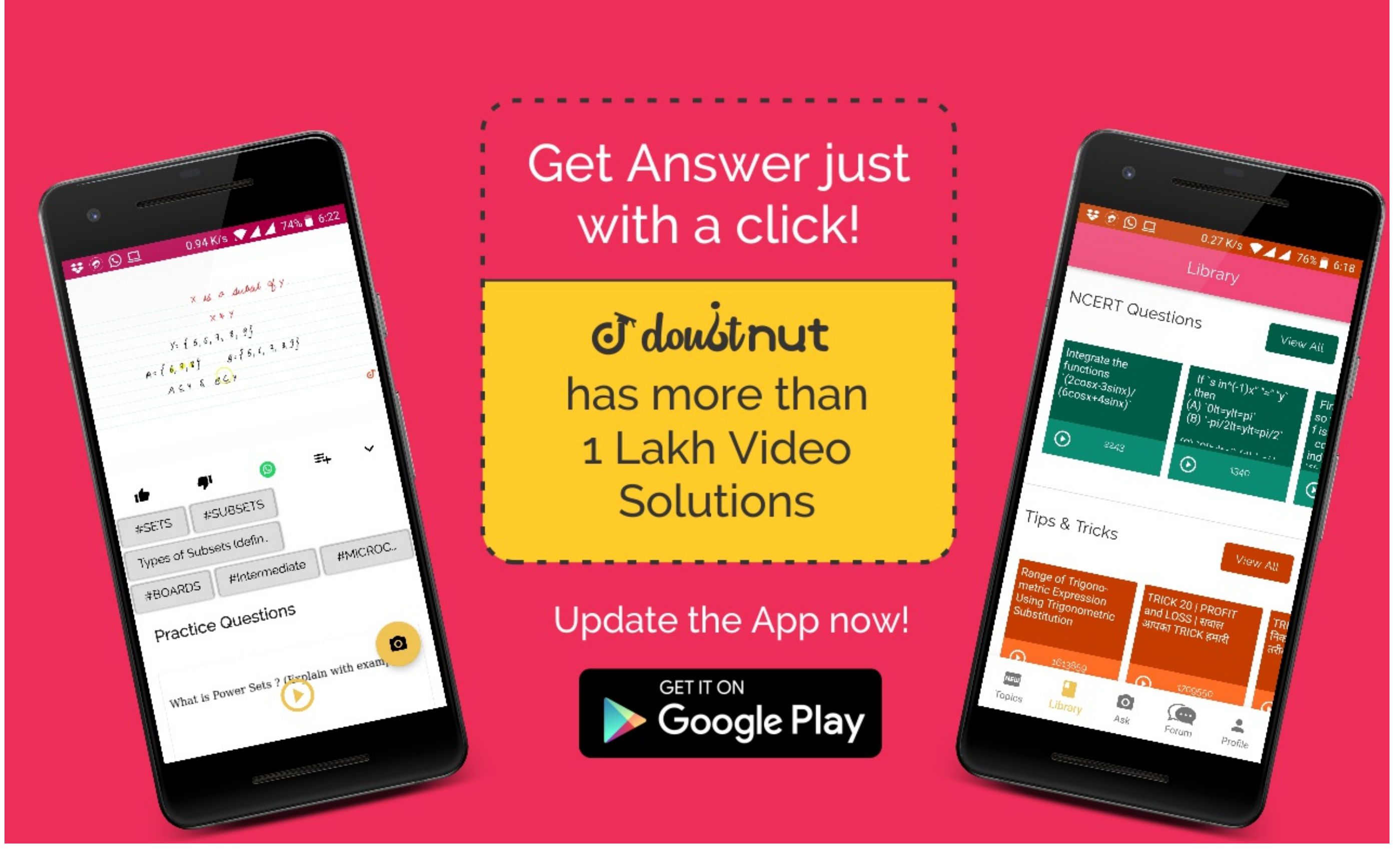
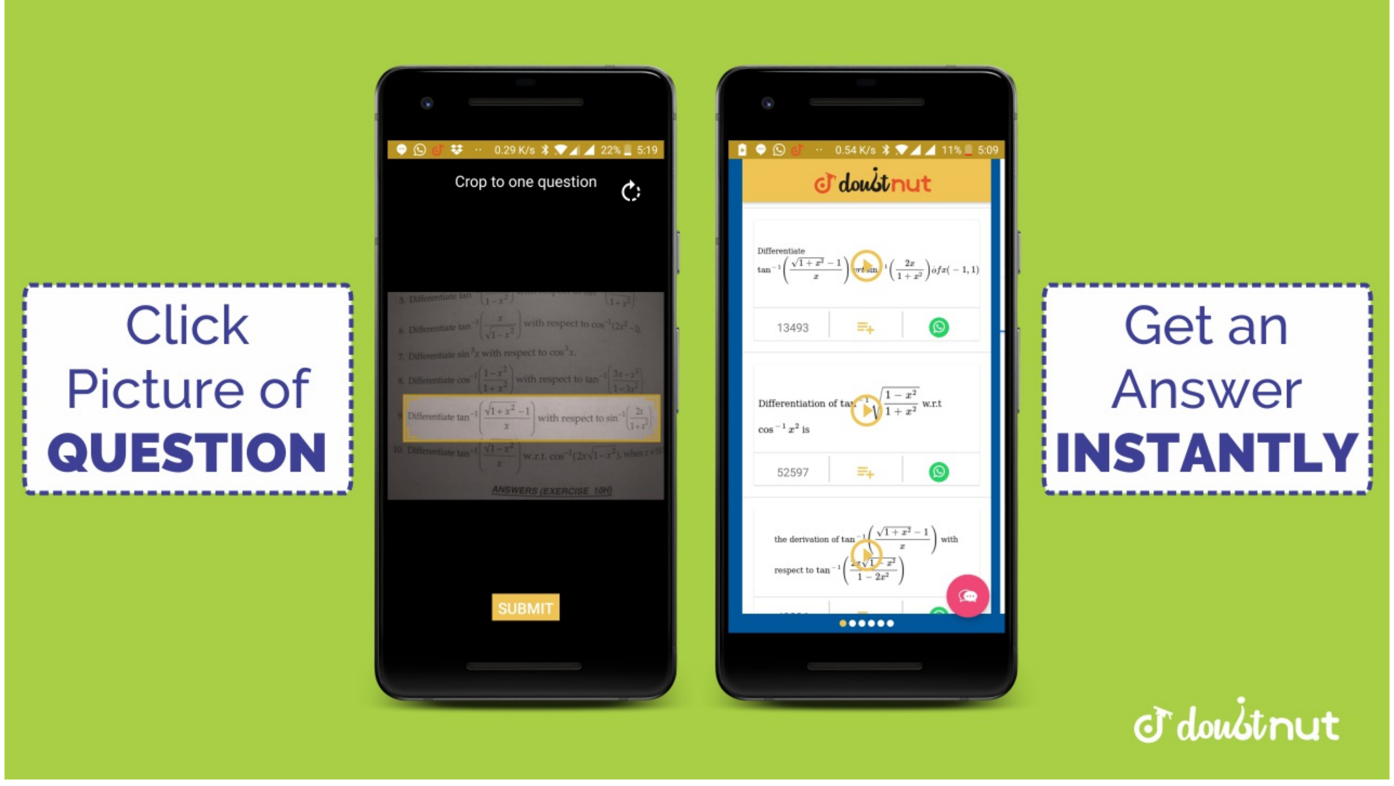
Ques No.	Question
1	**JEE MAINS MATHS SOLUTIONS - 2009** Let the line $\frac{x-2}{3}=\frac{y-1}{-5}=\frac{z+2}{2}$ lie in the plane $x+3y\alpha z+\beta=0$. Then (α,β) equals (1) $(6,\ -17)$ (2) $(-6,7)$ (3) $(5,\ -15)$ (4) $(-5,5)$ Watch Free Video Solution on Doubtnut
2	**JEE MAINS MATHS SOLUTIONS - 2009** Let a, b, c be such that $b(a+c)\neq 0$. If $\lvert aa+1a-1-\ +1b-1$ $-1c+1\rvert+\lvert a+1b+1c$ $-1a-1b-1c$ $+1(-1)^{n+2}a(-1)^{n+1}b($ $-1)^{n}c\rvert=0$ then the value of n is (1) zero (2) any even integer (3) any odd integer (4) any integer Watch Free Video Solution on Doubtnut
3	**JEE MAINS MATHS SOLUTIONS - 2009** If the mean deviation of the numbers $1,1+d,1+2d,...,1+100d$ from their mean is 255, then the d is equal to (1) 10.0 (2) 20.0 (3) 10.1 (4) 20.2 Watch Free Video Solution on Doubtnut



4	**JEE MAINS MATHS SOLUTIONS - 2009** If the roots of the equation $bx^2+cx+a=0$ be imaginary, then for all real values of x, the expression $3b^2x^2+6bcx+2c^2$ is (1) greater than 4ab (2) less than 4ab (3) greater than $4ab$ (4) less than $4ab$ Watch Free Video Solution on Doubtnut
5	**JEE MAINS MATHS SOLUTIONS - 2009** Let A and B denote the statements A: $\cos a+\cos b+\cos g=0$ B : $\sin a+\sin b+\sin g=0$ If $\cos(bg)+\cos(ga)+\cos(ab)$ $=3/2$, then (1) A is true and B is false (2) A is false and B is true (3) both A and B are true (4) both A and B are false Watch Free Video Solution on Doubtnut
6	**JEE MAINS MATHS SOLUTIONS - 2009** The lines $p(p^2+1)xy+q=0$ and $(p^2+1)^2x+(p^2+1)y+2q$ $=0$ are perpendicular to a common line for (1) no value of p (2) exactly one value of p (3) exactly two values of p (4) more than two values of p Watch Free Video Solution on Doubtnut
7	**JEE MAINS MATHS SOLUTIONS - 2009** If A, B and C are three sets such that $A\cap B=A\cap C$ and $A\cup B=A\cup C$, then (1) $A=B$ (2) $A=C$ (3) $B=C$ (4) $A\cap B=\varphi$ Watch Free Video Solution on Doubtnut

doubtnut पढ़ना हुआ आसान	
8	**JEE MAINS MATHS SOLUTIONS - 2009** If $\vec{u}$, $\vec{v}$, $\vec{w}$ are noncoplanar vectors and p, q are real numbers, then the equality $\left[3\vec{u}, p\vec{v}, p\vec{w}\right] - \left[p\vec{v}, \vec{w}, q\vec{u}\right] - \left[2\vec{w}, q\vec{v}, q\vec{u}\right] = 0$ holds for (1) exactly one value of (p, q) (2) exactly two values of (p, q) (3) more than two but not all values of (p, q) (4) all values of (p, q) Watch Free Video Solution on Doubtnut
9	**JEE MAINS MATHS SOLUTIONS - 2009** From 6 different novels and 3 different dictionaries, 4 novels and 1 dictionary are to be selected and arranged in a row on a shelf so that the dictionary is always in the middle. Then the number of such arrangements is (1) less than 500 (2) at least 500 but less than 750 (3) at least 750 but less than 1000 (4) at least 1000 Watch Free Video Solution on Doubtnut
10	**JEE MAINS MATHS SOLUTIONS - 2009** $\int_0^{\pi} [\cot x] dx$, where [.] denotes the greatest integer function, is equal to (1) $\pi/2$ (2) 1 (3) 1 (4) $\pi/2$ Watch Free Video Solution on Doubtnut
11	**JEE MAINS MATHS SOLUTIONS - 2009** For real x, let $f(x) = x^3 + 5x + 1$, then (1) f is oneone but not onto R (2) f is onto R but not oneone (3) f is oneone and onto R (4) f is neither oneone nor onto R Watch Free Video Solution on Doubtnut

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In a binomial distribution $B\left(n, p=\frac{1}{4}\right)$, if the probability of at least one success is greater than or equal to $\frac{9}{10}$, then n is greater than (1) $\frac{1}{(\log)_{10}^{4}-(\log)_{10}^{3}}$ (2) $\frac{1}{(\log)_{10}^{4}+(\log)_{10}^{3}}$ (3) $\frac{9}{(\log)_{10}^{4}-(\log)_{10}^{3}}$ (4) $\frac{4}{(\log)_{10}^{4}-(\log)_{10}^{3}}$

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If P and Q are the points of intersection of the circles $x^2+y^2+3x+7y+2p5=0$ and $x^2+y^2+2x+2yp^2=0$, then there is a circle passing through P, Q and $(1, 1)$ for (1) all values of p (2) all except one value of p (3) all except two values of p (4) exactly one value of p

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The projections of a vector on the three coordinate axis are 6, 3 , 2 respectively. The direction cosines of the vector are (1) $6, -3, 2$ (2) $\frac{6}{5}, \frac{-3}{5}, \frac{2}{5}$ (3) $\frac{6}{7}, \frac{-3}{7}, \frac{2}{7}$ (4) $\frac{-6}{7}, \frac{-3}{7}, \frac{2}{7}$

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If $\left|z-\frac{4}{z}\right|=2$, then the maximum value of $|Z|$ is equal to (1) $\sqrt{3}+1$ (2) $\sqrt{5}+1$ (3) 2 (4) $2+\sqrt{2}$

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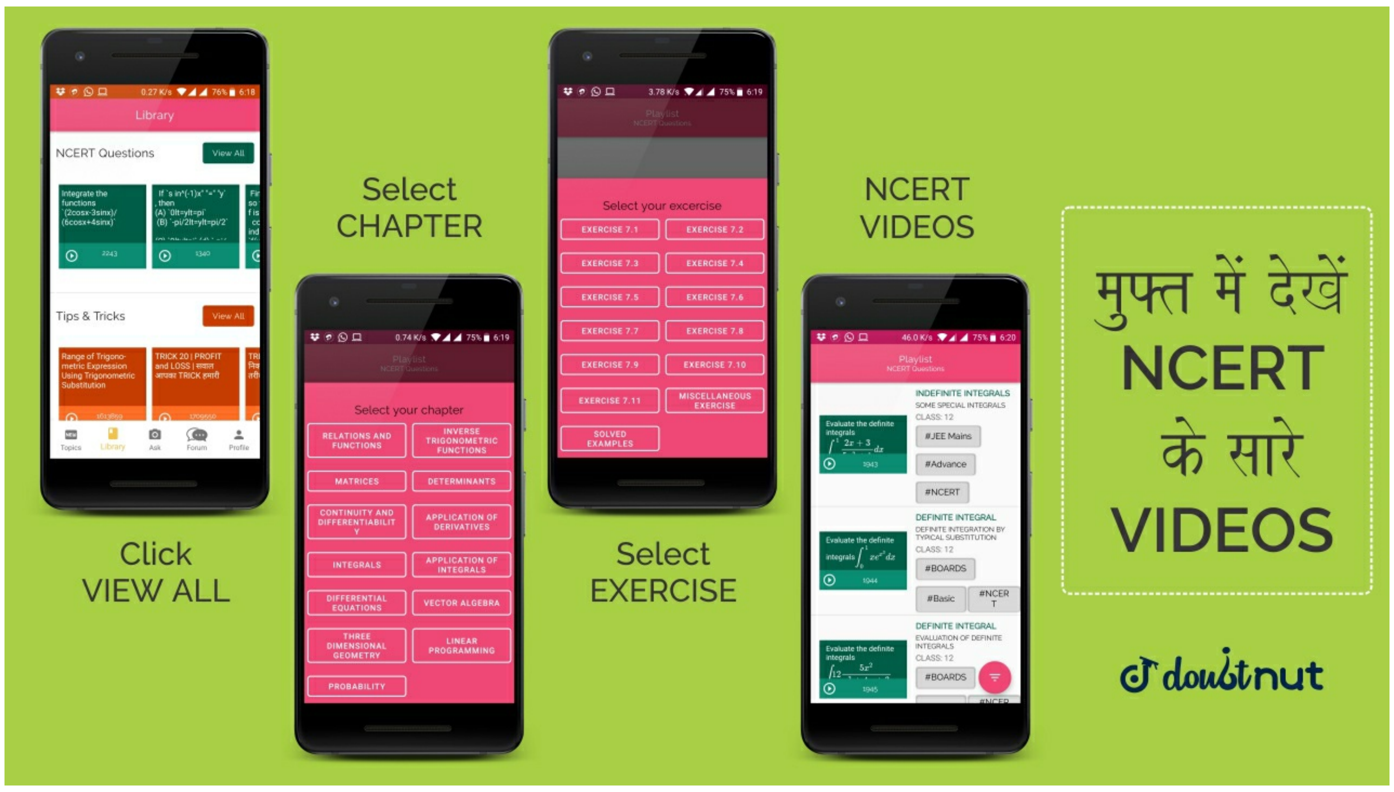
doubtnut पढ़ना हुआ आसान	
16	**JEE MAINS MATHS SOLUTIONS - 2009** Three distinct points A, B and C are given in the 2dimensional coordinate plane such that the ratio of the distance of any one of them from the point (1,""0) to the distance from the point (1, 0) is equal to 1/3 . Then the circumcentre of the triangle ABC is at the point Watch Free Video Solution on Doubtnut
17	**JEE MAINS MATHS SOLUTIONS - 2009** The remainder left out when $8^{2n}(62)^{2n+1}$ is divided by 9 is (1) 0 (2) 2 (3) 7 (4) 8 Watch Free Video Solution on Doubtnut
18	**JEE MAINS MATHS SOLUTIONS - 2009** The ellipse $x^2+4y^2=4$ is inscribed in a rectangle aligned with the coordinate axes, which in turn is inscribed in another ellipse that passes through the point (4, 0). Then the equation of the ellipse is (1) $x^2+16y^2=16$ (2) $x^2+12y^2=16$ (3) $4x^2+48y^2=48$ (4) $4x^2+64y^2=48$ Watch Free Video Solution on Doubtnut
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19	The sum to infinity of the series $1+\frac{2}{3}+\frac{6}{3^2}+\frac{10}{3^3}+\frac{14}{3^4}\dots$ is (1) 2 (2) 3 (3) 4 (4) 6 Watch Free Video Solution on Doubtnut
	
20	**JEE MAINS MATHS SOLUTIONS - 2009** The differential equation which represents the family of curves $y=c_1e^{c_2x}$, where $c_1 \text{and} c_2$ are arbitrary constants, is (1) $y'=y^2$ (2) $y''=y'y$ (3) $yy''=y'$ (4) $yy''=(y')^2$ Watch Free Video Solution on Doubtnut
21	**JEE MAINS MATHS SOLUTIONS - 2009** One ticket is selected at random from 50 tickets numbered 00, 01, 02, ... , 49. Then the probability that the sum of the digits on the selected ticket is 8, given that the product of these digits is zero, equals (1) 1/14 (2) 1/7 (3) 5/14 (4) 1/50 Watch Free Video Solution on Doubtnut
22	**JEE MAINS MATHS SOLUTIONS - 2009** Let y be an implicit function of x defined by $x^2x2x^x \cot y1=0$. Then y (1) equals (1) 1 (2) 1 (3) $\log 2$ (4) $\log 2$ Watch Free Video Solution on Doubtnut

23	**JEE MAINS MATHS SOLUTIONS - 2009** The area of the region bounded by the parabola $(y2)^2 = x1$, the tangent to the parabola at the point (2, 3) and the xaxis is (1) 3 (2) 6 (3) 9 (4) 12 Watch Free Video Solution on Doubtnut
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24	**JEE MAINS MATHS SOLUTIONS - 2009** Given $P(x) = x^4 + ax^3 + cx + d$ such that $x = 0$ is the only real root of $P'(x) = 0. If P(1) < P(1)$, then in the interval $[1, 1]$. (1) P(1) is the minimum and P(1) is the maximum of P (2) P(1) is not minimum but P(1) is the maximum of P (3) P(1) is the minimum but P(1) is not the maximum of P (4) neither P(1) is the minimum nor P(1) is the maximum of P Watch Free Video Solution on Doubtnut
25	**JEE MAINS MATHS SOLUTIONS - 2009** The shortest distance between the line $yx = 1$ and the curve $x = y^2$ is (1) $\frac{3\sqrt{2}}{8}$ (2) $\frac{2\sqrt{3}}{8}$ (3) $\frac{3\sqrt{2}}{5}$ (4) $\frac{\sqrt{3}}{4}$ Watch Free Video Solution on Doubtnut
26	**JEE MAINS MATHS SOLUTIONS - 2009** Let $f(x) = (x+1)^2 - 1, x \geq -1$ Statement 1: The set $\{x : f(x) = f^{-1}(x)\} = \{0, -1\}$

. Statement 2: f is a bijection.

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Let $f(x) = x|x|andg(x) = s \in x$ Statement 1 : gof is differentiable at $x = 0$ and its derivative is continuous at that point Statement 2: gof is twice differentiable at $x = 0$ (1) Statement1 is true, Statement2 is true, Statement2 is a correct explanation for statement1 (2) Statement1 is true, Statement2 is true; Statement2 is not a correct explanation for statement1. (3) Statement1 is true, statement2 is false. (4) Statement1 is false, Statement2 is true

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Statement 1: The variance of first n even natural numbers is $\frac{n^2 - 1}{4}$ Statement 2: The sum of first n natural numbers is $\left(n\frac{n+1}{2}\right.$ and the sum of squares of first n natural numbers is $\left(n(n+1)\frac{2n+1}{6}\right.$ (1) Statement1 is true, Statement2 is true, Statement2 is a correct explanation for statement1 (2) Statement1 is true, Statement2 is true; Statement2 is not a correct explanation for statement1. (3) Statement1 is true, statement2 is false. (4) Statement1 is false, Statement2 is true

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Let A be a 2×2 matrix Statement 1 : $adj(adjA) = A$ Statement 2 : $|adjA| = |A|$ (1) Statement1 is true, Statement2 is true, Statement2 is a correct explanation for statement1 (2) Statement1 is true, Statement2 is true; Statement2 is not a correct explanation for statement1. (3) Statement1 is true, statement2 is false. (4) Statement1 is false, Statement2 is true

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