

Ques No.	Question
1 - 2427	<p>The order of the differential equation</p> $2x^2 \frac{d^2y}{dx^2} - 3 \frac{dy}{dx} + y = 0$ <p>is (A) 2 (B) 1 (C) 0 (D) not defined</p> <p><a href="#">Watch Free Video Solution on Doubtnut</a></p>
2 - 6341	<p>The solution of <math>\frac{dx}{dy} + y = ye^{(n-1)x}</math> (<math>n \neq 1</math>) is</p> <p>(A) <math>\frac{1}{n-1} \ln \left( \frac{e^{(n-1)x} - 1}{e^{(n-1)x}} \right) = \frac{y^2}{2} + C</math></p> <p>(B) <math>e^{(1-n)x} = 1 + Ce^{(n-1) \left( \frac{y^2}{2} \right)}</math></p> <p>(C) <math>\ln \left( 1 + Ce^{(n-1) \left( \frac{y^2}{2} \right)} \right) + nx + 1 = 0</math></p> <p>(D) <math>e^{(n-1)x} = Ce^{(n-1) + (n-1) \left( \frac{y^2}{2} \right)} + 1</math></p> <p><a href="#">Watch Free Video Solution on Doubtnut</a></p>
3 - 9581	<p>The function <math>y=f(x)</math> is the solution of the differential equation</p> $\frac{dy}{dx} + \frac{xy}{x^2 - 1} = \frac{x^4 + 2x}{\sqrt{1 - x^2}}$ <p>in <math>(-1, 1)</math>, satisfying <math>f(0) = 0</math>.</p>

Then  $\int_{-\frac{\sqrt{3}}{2}}^{\frac{\sqrt{3}}{2}} f(x) dx$  is (A)  $\frac{\pi}{3} - \frac{\sqrt{3}}{2}$  (B)  $\frac{\pi}{3} - \frac{\sqrt{3}}{4}$  (C)  $\frac{\pi}{6} - \frac{\sqrt{3}}{4}$  (D)  $\frac{\pi}{6} - \frac{\sqrt{3}}{2}$

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Solution of the differential equation

$\cos x dy = y(\sin x - y) dx, 0 < x < \frac{\pi}{2}$  (A)

4 - 11516

$\sec x = (\tan x + c)y$  (B)  $y \sec x = \tan x + c$  (C)

$y \tan x = \sec x + c$  (D)  $\tan x = (\sec x + c)y$

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If a curve  $y = f(x)$  passes through the point  $(1, -1)$  and satisfies the differential equation,  $y(1 + xy) dx = x dy$ , then

5 - 11678

$f\left(-\frac{1}{2}\right)$  is equal to: (A)  $-\frac{2}{5}$  (B)  $-\frac{4}{5}$  (C)  $\frac{2}{5}$  (D)  $\frac{4}{5}$

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What is the order of the differential equation

6 - 12322

$\frac{dx}{dy} + \int y dx = x^3$  (A) 1 (B) 2 (C) 3 (D) cannot be determined

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If  $y_1(x)$  and  $y_2(x)$  are two solutions of  $\frac{dy}{dx} + f(x)y = r(x)$ ,  
 then  $y_1(x) + y_2(x)$  is solution of : (A)  $\frac{dy}{dx} + f(x)y = 0$  (B)

$\frac{dy}{dx} + 2f(x)y = r(x)$  (C)  $\frac{dy}{dx} + f(x)y = 2r(x)$  (D)  
 $\frac{dy}{dx} + 2f(x)y = 2r(x)$

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If  $y = y(x)$  satisfies the differential equation

$$8\sqrt{x} \left( \sqrt{9 + \sqrt{x}} \right) dy = \left( \sqrt{4 + \sqrt{9 + \sqrt{x}}} \right)^{-1} dx, x > 0$$

and  $y(0) = \sqrt{7}$ , then  $y(256) =$  (A) 16 (B) 80 (C) 3 (D) 9

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The differential equation representing the family of curves

$$y^2 = 2c(x + \sqrt{c}), \text{ where } c \text{ is a positive parameter, is of (A)}$$

order 1 (B) order 2 (C) degree 3 (D) degree 4

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the family of all differential equations passing through  $(0, 2)$  is

10 - 41891

$$(A) y = x \frac{dy}{dx} \quad (B) \frac{d^2y}{dx^2} = 0 \quad (C) \frac{dy}{dx} = 2 \quad (D) y = x \frac{dy}{dx} + 2$$

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The solution of the differential equation

$$\frac{x^2 dy}{dx} \cos\left(\frac{1}{x}\right) - y \sin\left(\frac{1}{x}\right) = -1, \text{ where } y \rightarrow 1 \text{ as}$$

11 - 44501

$$x \rightarrow \infty \text{ is (A) } y = \sin\left(\frac{1}{x}\right) + \cos\left(\frac{1}{x}\right) \quad (B)$$

$$y = \frac{x+1}{x \sin\left(\frac{1}{x}\right)} \quad (C) y = \sin\left(\frac{1}{x}\right) - \cos\left(\frac{1}{x}\right) \quad (D)$$

$$y = \frac{x}{x \cos\left(\frac{1}{x}\right)}$$

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12 - 44593

The solution of the differential equation  $(x + y)^2 \frac{dy}{dx} = 1$ ,

satisfying the condition  $y(1) = 0$  is (A)

$$y + \frac{\pi}{4} = \tan^{-1}(x + y) \quad (\text{B}) \quad y - \frac{\pi}{4} = \tan^{-1}(x + y) \quad (\text{C})$$

$$y = \tan^{-1} x \quad (\text{D}) \quad y = \tan^{-1}(\ln x) + 1$$

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The equation of one of the curves whose slope of tangent at any point is equal to  $y + 2x$  is (A)  $y = 2(e^x + x - 1)$  (B)

13 - 50655

$$y = 2(e^x - x - 1) \quad (\text{C}) \quad y = 2(e^x - x + 1) \quad (\text{D})$$

$$y = 2(e^x + x + 1)$$

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The first integration of  $\frac{dy}{dx} \left( \frac{d^2y}{dx^2} \right) - x^2y \left( \frac{dy}{dx} \right) = xy^2$  will

14 - 59098

$$\text{be (A) } \frac{dy}{dx} = \sqrt{c - x^2y^2} \quad (\text{B) } \frac{dy}{dx} = \sqrt{c + x^2y^2} \quad (\text{C) }$$

$$\frac{dy}{dx} = -\sqrt{c + x^2y^2} \quad (\text{D) } \frac{dy}{dx} = -\sqrt{c - x^2y^2}$$

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15 - 67025

A function  $y=f(x)$  satisfies the differential equation

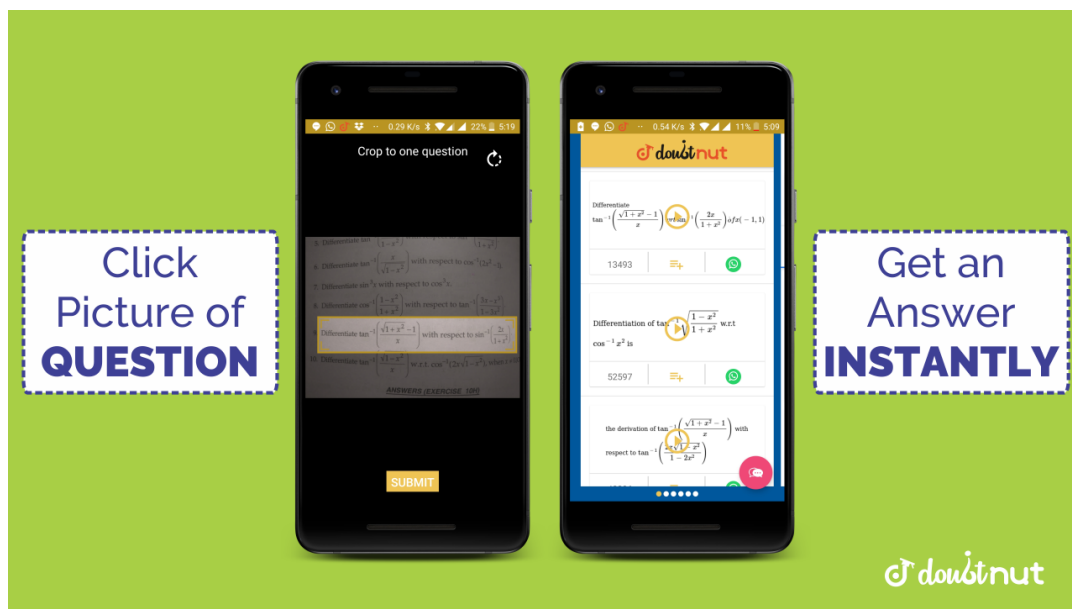
$$f(x)\sin 2x - \cos x + (1 + \sin^2 x) f'(x) = 0 \text{ with initial}$$

condition  $y(0) = 0$ . The value of  $f\left(\frac{\pi}{6}\right)$  is equal to (A)  $\frac{1}{5}$  (B)

$\frac{3}{5}$  (C)  $\frac{4}{5}$  (D)  $\frac{2}{5}$

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If the differentiable equation  $\frac{dy}{dx} - y = y^2(\sin x + \cos x)$  with  $y(0) = 1$  then  $y(\pi)$  has the value equal to (A)  $-e^\pi$  (B)  $-e^{-\pi}$  (C)  $e^{-\pi}$  (D)  $-e^{-\pi}$

16 - 67027

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17 - 67158

If  $f(x)$ ,  $g(x)$  be twice differentiable functions on  $[0,2]$  satisfying  $f''(x) = g''(x)$ ,  $f'(1) = 2g'(1) = 4$  and

$f(2) = 3g(2) = 9$ , then  $f(x) - g(x)$  at  $x = 4$  equals (A) 0

(B) 10 (C) 8 (D) 2

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The solution of the differential equation

$$x dy + y dx - \sqrt{1 - x^2 y^2} dx = 0 \text{ is (A)}$$

18 - 71277

$$\sin^{-1}(xy) = C - x \text{ (B) } xy = \sin(x + c) \text{ (C)}$$

$$\log(1 - x^2 y^2) = x + c \text{ (D) } y = x \sin x + c$$

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Consider the differential equation  $y^2 dx + \left(x + \frac{1}{y}\right) dy = 0$ .

If  $y(1) = 1$ , then  $x$  is given by: (A)  $1 - \frac{1}{y} + \frac{1}{e^y}$  (B)

19 - 73865

$$4 - \frac{2}{y} - \frac{e^y}{e} \text{ (C) } 3 - \frac{1}{y} + \frac{e^y}{e} \text{ (D) } 1 + \frac{1}{y} - \frac{1}{e^y}$$

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20 - 75979

The degree of the differential equation satisfying the relation

$$\sqrt{1 + x^2} + \sqrt{1 + y^2} = \lambda \left( x \sqrt{1 + y^2} - y \sqrt{1 + x^2} \right) \text{ is}$$

(A) 1 (B) 2 (C) 3 (D) none of these

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21 - 89566

Family  $y = Ax + A^3$  of curve represented by the differential equation of degree (A) Three (B) Two (C) One (D) No

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22 - 90966

The solution of the differential equation  $\sqrt{a+x} \frac{dy}{dy} + xy = 0$  is (A)  $y = Ae^{\frac{2}{3}(2a-x)\sqrt{a+x}}$  (B)  $y = Ae^{-\frac{2}{3}(2a-x)\sqrt{a+x}}$  (C)  $y = Ae^{\frac{2}{3}(2a+x)\sqrt{x-a}}$

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23 - 105169

The solution of the differential equation  $ydx + (x + x^2y)dy = 0$  is (A)  $-\frac{1}{xy} = c$  (B)  $\log y = cx$  (C)  $\frac{1}{xy} + \log y = c$  (D)  $-\frac{1}{xy} + \log y = c$

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If the solution of the differential equation  $\frac{dy}{dx} + P(x)y = xy^3$  is  $y^2(1 + cx^2) = 1$ ,  $c$  being an arbitrary constant, then  $p(x)$  is

24 - 109021

- (A)  $-x$  (B)  $\frac{x}{2}$  (C)  $x$  (D)  $2x$

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If  $\frac{dy}{dx} = 1 + x + y + xy$  and  $y(-1) = 0$ , then function  $y$  is

25 - 112623

- (A)  $e^{\frac{(1-x)^2}{2}}$  (B)  $e^{\frac{(1-x)^2}{2}} - 1$  (C)  $\log_e(1 + x) - 1$  (D)  $1 + x$

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26 - 112630

The solution of the differential equation

$(1 + y + x^2y)dx + (x + x^3)dy = 0$  is (A)  $xy = c - \tan x$

(B)  $xy = c - \arctan x$  (C)  $xy = c - x$  (D) none of these

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A particle moves in a line with velocity given by  $\frac{ds}{dt} = s + 1$ .

The time taken by the particle to cover a distance of 9 metre is

27 - 127634

(A) 1 (B)  $\log 10$  (C)  $2 \log 10$  (D) 10

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The order of the differential equation whose solution is given by

$$y = c_1 x + (c_2 + c_3)e^{\log x} + c_4 \cos(x + c_5), \text{ where}$$

28 - 206886

$C_1, C_2, C_3, C_4$  and  $C_5$  are arbitrary constants, is 1(A) 2 (B) 3

(C) 4 (D) 5

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The solution of the differential equation

$$(1 + y^2) + (x - e^{\tan^{-1} y}) \frac{dy}{dx} = 0, \text{ is (A)}$$

29 - 234926

$$(x - 2) = ke^{-\tan^{-1} y} \text{ (B) } 2xe^{2\tan^{-1} y} = e^{2\tan^{-1} y} + k \text{ (C)}$$

$$xe^{\tan^{-1} y} = \tan^{-1} y + k \text{ (D) } xe^{2\tan^{-1} y} = e^{\tan^{-1} y} + k$$

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30 - 262307

If  $m$  and  $n$  are order and degree of the differential equation

$$\left(\frac{d^2y}{dx^2}\right)^5 + \frac{4\left(\frac{d^2y}{dx^2}\right)^3}{\frac{d^3y}{dx^3}} + \frac{d^3y}{dx^3} = x^2 - 1 \quad (\text{A}) \quad m = 3, n = 1$$

(B)  $m = 3, n = 3$  (C)  $m = 3, n = 2$  (D)  $m = 3, n = 5$

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Solution of the differential equation

$$(xy + y + e^{-x})dx + (x + e^{-x})dy = 0 \text{ when } y(0) = 1$$

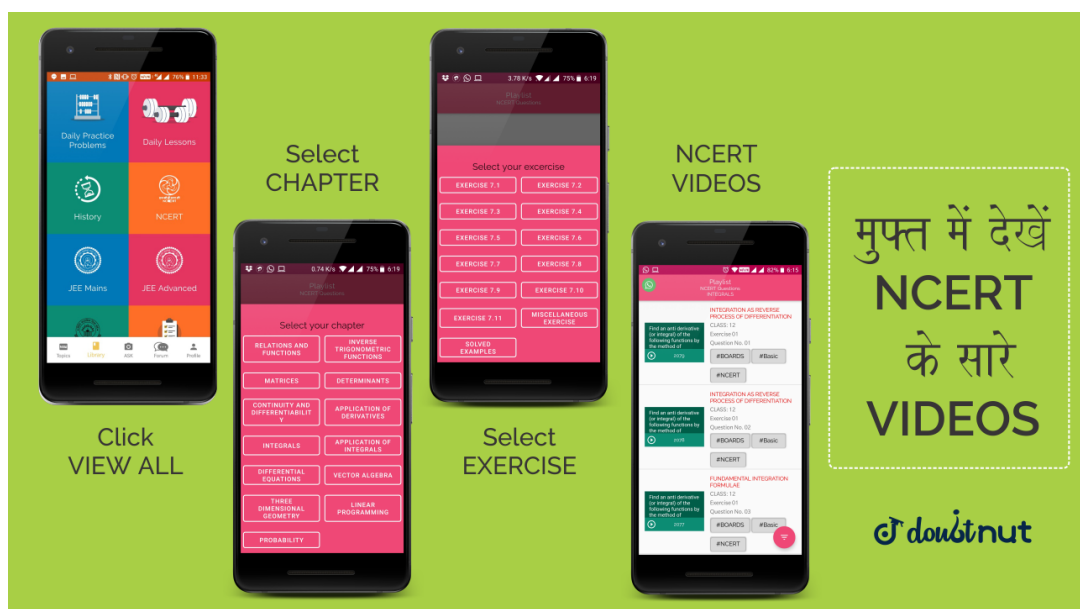
31 - 286488

Then  $y(-1) =$  is equal to (A)  $\frac{e}{e-1}$  (B)  $\frac{2e}{e-1}$  (C)  $\frac{e}{1-e}$

(D) 0

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32 - 328645

Orthogonal trajectories of the family of curves represented by

$$x^2 + 2y^2 - y + c = 0 \text{ is (A) } y^2 = a(4x - 1) \text{ (B)}$$

$$y^2 = a(4x^2 - 1) \text{ (C) } x^2 = a(4y - 1) \text{ (D)}$$

$$x^2 = a(4y^2 - 1)$$



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33 - 387793

$$\text{Solution of } D \cdot E \cdot \frac{dy}{dx} = \frac{3x + 4y + 3}{12x + 16y - 4} \text{ is (A)}$$

$$y = 4x + \ln(3x + 4y) + c \text{ (B) } 4y = x + \ln(3x + 4y) + c$$

$$\text{(C) } y = \ln(3x + 4y) + c \text{ (D) } x + y = \ln(3x + 4y) + c$$



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If the differential equation representing the family of all circles

34 - 1203771

$$\text{touching } x\text{-axis at the origin is } (x^2 - y^2) \frac{dy}{dx} = g(x)y \text{ then}$$

$$g(x) \text{ equals, (A) } \frac{x}{2} \text{ (B) } 2x^2 \text{ (C) } 2x \text{ (D) } \frac{x^2}{2}$$



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35 - 1215756

$$\text{The general solution of the differential equation } \frac{dy}{dx} = \frac{x^2}{y^2} \text{ is}$$

$$\text{(A) } x^2 + y^2 = c \text{ (B) } x^2 - y^2 = c \text{ (C) } x^3 + y^3 = c \text{ (D)}$$

$$x^3 - y^3 = c$$

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36 - 1215867

The solution of the differential equation  $\frac{dy}{dx} = \frac{x^2 + xy + y^2}{x^2}$  is (A)  $\tan^{-1}\left(\frac{x}{y}\right) = \log y + c$  (B)  $\tan^{-1}\left(\frac{y}{x}\right) = \log x + c$  (C)  $\tan^{-1}\left(\frac{x}{y}\right) = \log x + c$  (D)  $\tan^{-1}\left(\frac{y}{x}\right) = \log y + c$

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37 - 1219311

The solution of  $\frac{dy}{dx} + \sqrt{\frac{1-y^2}{1-x^2}} = 0$  is (A)  $\tan^{-1} x + \cot^{-1} x = c$  (B)  $\sin^{-1} x + \sin^{-1} y = c$  (C)  $\sec^{-1} x + \operatorname{cosec}^{-1} x = c$  (D) none of these

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38 - 1253046

If the solution of the differential equation  $x \frac{dy}{dx} + y = xe^x$  be  $xy = e^x \phi(x) + c$  then  $\phi(x)$  is: (A)  $x + 1$  (B)  $x - 1$  (C)  $1 - x$  (D)  $x$

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39 - 1253879

The solution of the differential equation  $\frac{dy}{dx} = e^{x-y} + x^2 e^{-y}$  is (A)  $y = e^x + \frac{1}{2}x^2 + c$  (B)  $e^{y-x} = \frac{1}{3}x^3 + c$  (C)

$$e^y = e^x + \frac{1}{3}x^3 + c \text{ (D) none of these}$$

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The degree of the differential equation

$$x = 1 + \left(\frac{dy}{dx}\right) + \frac{1}{2!} \left(\frac{dy}{dx}\right)^2 + \frac{1}{3!} \left(\frac{dy}{dx}\right)^3 + \dots$$

40 - 1268751

(A) 3 (B) 2 (C) 1 (D) not defined

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The equation of the curve through the point (3, 2) and whose

41 - 2474819

slope is  $\frac{x^2}{y+1}$ , is (A) 1 (B) 2 (C) 3 (D) 4

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42 - 2475870

The orthogonal trajectories of the family of curves an

$a^{n-1}y = x^n$  are given by (A)  $x^n + n^2y = \text{constant}$  (B)

$ny^2 + x^2 = \text{constant}$  (C)  $n^2x + y^n = \text{constant}$  (D)

$$y = x$$

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The solution of the differential equation

$\log\left(\frac{dy}{dx}\right) = 4x - 2y - 2, y = 1$  when  $x = 1$ , is (A)

43 - 2573062

$2e^{2y+2} = e^{4x} + e^2$  (B)  $2e^{2y-2} = e^{4x} + e^2$  (C)

$2e^{2y+2} = e^{4x} + e^4$  (D)  $3e^{2y+2} = e^{3x} + e^4$

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If  $\frac{dy}{dx} = \frac{xy + y}{xy + x}$ , then the solution of the differential equation

44 - 2688342

is (A)  $y = xe^x + c$  (B)  $y = e^x + c$  (C)  $y = Axe^{x-y}$  (D)

$$y = x + A$$

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45 - 2688466

The family of curves passing through  $(0, 0)$  and satisfying the

differential equation  $\frac{y_2}{y_1} = 1$  (where,  $y_n = \frac{d^n y}{dx^n}$ ) is (A)

$$y = k \text{ (B) } y = kx \text{ (C) } y = k(e^x + 1) \text{ (C) } y = k(e^x - 1)$$

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solution of differential equation

$$x \cos x \frac{dy}{dx} + y(x \sin x + \cos x) = 1 \text{ is (A)}$$

46 - 2843459

$$xy = \sin x + c \cos x \text{ (B) } xy \sec x = \tan x + c \text{ (C)}$$

$$xy + \sin x + c \cos x = 0 \text{ (D) } xy = \sin x - c \cos x$$

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The solution of  $\cos(x + y)dy = dx$  is (A)

$$y = \tan\left(\frac{x + y}{2}\right) + c \text{ (B) } y = x \sec\left(\frac{y}{x}\right) + c \text{ (C)}$$

47 - 2848394

$$y = \cos^{-1}\left(\frac{y}{x}\right) + c \text{ (D) none of these}$$

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48 - 2874586

The solution of the differential equation

$(1 + x^2)dy + (1 + y^2)dx = 0$  is (A)  $x - y = c(1 + xy)$

(B)  $x + y = c(1 - xy)$  (C)  $xy = c(x + y)$  (D)

$xy = c(x - y)$

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Let  $y' = \frac{4y^2 + 4xy + x^2}{4x^2}$  and  $y(1) = 0$ , then  $y\left(e^{\frac{\pi}{2}}\right)$

equals (A)  $\frac{1}{2}e^{\frac{\pi}{2}}$  (B)  $e^{\frac{\pi}{2}}$  (C)  $\frac{1}{4}e^{\frac{\pi}{2}}$  (D)  $\frac{\pi}{2}$

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50 - 3346635

The solution of the differential equation  $\frac{dy}{dx} = \cos(x - y)$  is

(A)  $y + \cot\left(\frac{x - y}{2}\right) = c$  (B)  $x + \cot\left(\frac{x - y}{2}\right) = c$  (C)

$x + \tan\left(\frac{x - y}{2}\right) = c$  (D) none of these

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The solution of differential equation  $\frac{dy}{dx} = \frac{y}{x} + \frac{\phi\left(\frac{y}{x}\right)}{\phi'\left(\frac{y}{x}\right)}$  is

(A)  $x\phi\left(\frac{y}{x}\right) = k$  (B)  $\phi\left(\frac{y}{x}\right) = kx$  (C)  $y\phi\left(\frac{y}{x}\right) = k$  (D)

$\phi\left(\frac{y}{x}\right) = ky$

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52 - 3846930

The differential equations of all circles touching the x-axis at

origin is (A)  $(y^2 - x^2) = 2xy\left(\frac{dy}{dx}\right)$  (B)

$(x^2 - y^2)\left(\frac{dy}{dx}\right) = 2xy$  (C)  $(x^2 - y^2) = 2xy\left(\frac{dy}{dx}\right)$  (D)

none of these

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53 - 3989098

Which of the following is not the differential equation of family of

curves whose tangent form an angle of  $\frac{\pi}{4}$  with the hyperbola

$xy = c^2$ ? (A)  $\frac{dy}{dx} = \frac{x - y}{x + y}$  (B)  $\frac{dy}{dx} = \frac{x}{x - y}$  (C)

$\frac{dy}{dx} = \frac{x + y}{x - y}$  (D) N.O.T.

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54 - 4541862

The population  $p(t)$  at time  $t$  of a certain mouse species

satisfies the differential equation  $\frac{dp(t)}{dt} = 0.5p(t) - 450$  If

$p(0) = 850$ , then the time at which the population becomes

zero is (A)  $2 \ln 18$  (B)  $\ln 9$  (C)  $\frac{1}{2} \ln 18$  (D)  $\ln 18$



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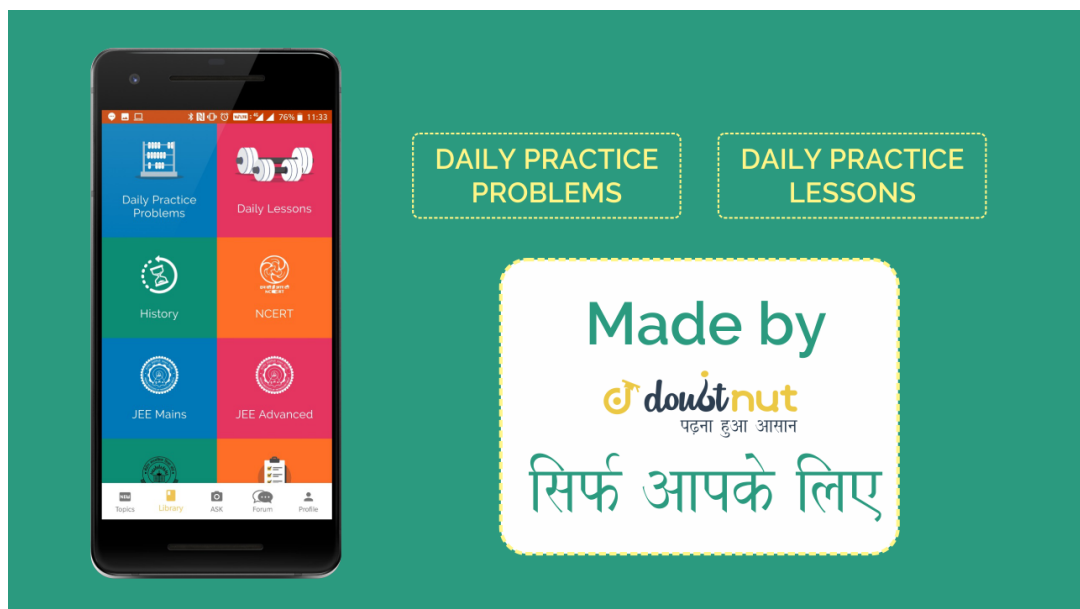
55 - 4863339

The differential equation of all conics whose centre lie at the origin is of order (A) 2 (B) 3 (C) 4 (D) none of these



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56 - 4869308

If  $(x^2 + y^2)dy = xydx$  and  $y(1) = 1$  and  $y(x_0) = e$ , then

$x_0 =$  (A)  $3e$  (B)  $\sqrt{2}e$  (C)  $\sqrt{3}e$  (D)  $\sqrt{3}$



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Solution of differential equation

$$f(x) \frac{dy}{dx} = (f(x))^2 + f(x)y + f(x)'. y \text{ is : (A)}$$

57 - 5446591

$$y = f(x) + ce^x \text{ (B) } y = -f(x) + ce^x \text{ (C)}$$

$$y = -f(x) + ce^x f(x) \text{ (D) } y = cf(x) + e^x$$

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The curve satisfying the differential equation,

$$ydx - (x + 3y^2)dy = 0 \text{ and passing through the point } (1, 1)$$

58 - 5592419

$$\text{, also passes through the point. (A) } \left(\frac{1}{4}, -\frac{1}{2}\right) \text{ (B)}$$

$$\left(\frac{1}{4}, \frac{1}{2}\right) \text{ (C) } \left(-\frac{1}{3}, \frac{1}{3}\right) \text{ (D) } \left(\frac{1}{3}, -\frac{1}{3}\right)$$

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The differential equation which represents the family of curves

$$y = c_1 e^{c_2 x}, \text{ where } c_1 \text{ and } c_2 \text{ are arbitrary constants, is (A)}$$

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$$y' = y^2 \text{ (B) } y'' = y'y \text{ (C) } yy'' = y' \text{ (D) } yy'' = (y')^2$$

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60 - 6054226

A normal is drawn at a point  $P(x, y)$  of a curve It meets the  $x$ -axis at  $Q$  If  $PQ$  is of constant length  $k$  such a curve passing through  $(0,k)$  is (A) a circle with centre  $(0,0)$  (B) a hyperbola with eccentricity  $\sqrt{2}$  (C)  $x^2 + y^2 = k^2$  (D)  $x^2 - y^2 = k^2$

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3 - 9581	<b>B</b> <a href="#">Watch Free Video Solution of this Question on Doubtnut</a>
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12 - 44593	<b>A</b> <a href="#">Watch Free Video Solution of this Question on Doubtnut</a>
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27 - 127634	B

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50 - 3346635	<b>B</b> <a href="#">Watch Free Video Solution of this Question on Doubtnut</a>
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51 - 3474336	<b>B</b> <a href="#">Watch Free Video Solution of this Question on Doubtnut</a>
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52 - 3846930	<b>B</b>

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53 - 3989098	<b>B</b> <a href="#">Watch Free Video Solution of this Question on Doubtnut</a>
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55 - 4863339	<b>B</b> <a href="#">Watch Free Video Solution of this Question on Doubtnut</a>
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56 - 4869308	<b>C</b> <a href="#">Watch Free Video Solution of this Question on Doubtnut</a>
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57 - 5446591	<b>C</b> <a href="#">Watch Free Video Solution of this Question on Doubtnut</a>
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58 - 5592419	<b>C</b> <a href="#">Watch Free Video Solution of this Question on Doubtnut</a>
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59 - 5890326	<b>D</b> <a href="#">Watch Free Video Solution of this Question on Doubtnut</a>
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