MATHS

BOOKS - JEE MAINS PREVIOUS YEAR

ENGLISH

DIFFERENTIAL EQUATIONS

Others

1. A particle just clears a wall of height b at distance a and strikes the ground at a

distance c from the point of projection. The angle of projection is (1) $\frac{\tan^{-1} b}{ac}$ (2) 45^o (3) $\frac{\tan^{-1}(bc)}{a(c-a)}$ (4) $\frac{\tan^{-1}(bc)}{a}$

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2. The differential equation of all circles passing through the origin and having their centres on the x-axis is (1) $x^2 = y^2 + xy\frac{dy}{dx}$ (2) $x^2 = y^2 + 3xy\frac{dy}{dx}$ (3) $y^2 = x^2 + 2xy\frac{dy}{dx}$ (4) $y^2 = x^2 - 2xy\frac{dy}{dx}$

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3. The solution of the differential equation $\frac{dy}{dx} = \frac{x+y}{x}$ satisfying the condition $y(1) = 1$ is (1) $y = \ln x + x$ (2) $y = x\ln x + x^2$ (3) $y = xe(x-1)$ (4) $y = x\ln x + x$

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4. The differential equation of the family of circles with fixed radius 5 units and centre on the line $y = 2$ is (1)

$(x-2)y'^2 = 25-(y-2)^2$ (2)

$(y-2)y'^2 = 25-(y\text{-}2)^2$ (3)

$(y-2)2y'^2 = 25-(y-2)^2$ (4)

$(x-2)2y'^2 = 25-(y-2)^2$

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5. The differential equation which represents the family of curves $y = c_1 e^{c_2 x}$, where $c_1 \text{and} c_2$ are arbitrary constants, is (1) $y' = y^2$ (2) $y'' = y'y$ (3) $yy'' = y'$ (4) $yy'' = (y')^2$

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6. Solution of the differential equation $\cos x dy = y(\sin x - y)dx, 0 < x < \frac{\pi}{2}$ (A) $\sec x = (\tan x + c)y$ (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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7. If $\frac{dy}{dx} = y + 3$ and $y(0)=2$, then $y(\ln 2)$ is equal to : (1) 7 (2) 5 (3) 13 (4) -2

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8. 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

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9. At present, a firm is manufacturing 2000 items. It is estimated that the rate of change of production P w.r.t. additional number of workers x is given by $\frac{dP}{dx} = 100 - 12\sqrt{x}.$ If the firm employs 25 more workers, then the new level of production of items is (1) 3000 (2) 3500 (3) 4500 (4) 2500

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10. Let the population of rabbits surviving at a time t be governed by the differential equation $\left(dp\frac{t}{dt} = \frac{1}{2}p(t) - 200.\right.$ If $p(0) = 100$, then p(t) equals

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