MATHS

BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

DIFFERENTIAL EQUATIONS

Solve Problem

1. The differential equation whose solution is $y = ce^x$, where c is an arbitrary constant, is

A. $\frac{dy}{dx} = x$

B. $\frac{dy}{dx} = y$

C. $\frac{dy}{dx} + x = 0$

D. $\frac{dy}{dx} + y = 0$

Answer: B

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2. The order and degree of the differential equation $\left[\left(\frac{dy}{dx}\right)^2+\left(\frac{d^2y}{dx^2}\right)\right]^{5/4}=k\frac{d^3y}{dx^3}$ is

A. 1, 2

B. 2, 3

C. 3, 4

D. 4, 5

Answer: C

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3. The solution of $\sqrt{1-x^2}dx+\sqrt{1-y^2}dy=0$ is

A. $x\sqrt{1-x^2}+y\sqrt{1-y^2}+\cosh^{-1}x+\cosh^{-1}y=c$

B. $x\sqrt{1+x^2}+y\sqrt{1+y^2}=c$

C. $x\sqrt{1+x^2}-y\sqrt{1+y^2}+\sinh^{-1}x-\sinh^{-1}y=c$

D. $\sinh^{-1}x+\sinh^{-1}y=c$

Answer: A

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4. Solve the following differential equations.

$$\frac{dy}{dx}=\frac{x-y}{x+y}$$

A. $x^2-y^2-2xy=0$

B. $x^2+y^2-2xy=0$

C. $x^2-y^2+2xy=0$

D. $x^2+y^2+2xy=0$

Answer: A

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5. The equation of the curve passing through the origin and satisfying $\frac{dy}{dx} + y = e^x$ is

A. $2y = e^{2x} + 1$

B. $2ye^x = e^x - 1$

C. $2ye^x = e^{2x} - 1$

D. $2ye^{2x} = 2e^x + 1$

Answer: C

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6. If m, n are the order and degree of the differential equation $\left(\frac{d^4y}{dx^4} + \frac{d^2y}{dx^2}\right)^{3/2} = a\frac{d^3y}{dx^3}$ respectively, then $2m + n =$

A. $\frac{11}{2}$

B. 7

C. 11

D. $\frac{7}{2}$

Answer: C

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7. If $e^{\frac{dy}{dx}} = x + 1$ and y = 3 when x = 0, then $y = (x + 1)\ln(x + 1) + f(x)$, where f(x) =

A. $3 - x$

B. $x - 3$

C. $1 - x$

D. $x - 1$

Answer: A

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8. The solution of $y^3 \cos \sqrt{x} dx - \sqrt{x} e^{1/y^2} dy = 0$ is

A. $es^{1/y^2} + 2 \sin \sqrt{x} = c$

B. $e^{1/y^2} + 4 \sin \sqrt{x} = c$

C. $e^{1/y^2} - 2 \sin \sqrt{x} = c$

D. $e^{1/y^2} - 4 \sin \sqrt{x} = c$

Answer: B

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9. The solution of $x \frac{dy}{dx} + y = y^2 x^3 \ln x$ is

A. $\frac{x^2}{4}(2Inx - 1) + \frac{1}{xy} = c$

B. $\frac{x^2}{4}(Inx + 1) + \frac{1}{xy} = c$

C. $\frac{x^2}{4}(2Inx + 1) + \frac{1}{xy} = c$

D. $\frac{x}{4}(Inx + 1) + \frac{1}{xy} = c$

Answer: A

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10. The order of the differential equation whose solution is given by $y = (c_1 + c_2)\cos(x + c_3) - c_4 e^{x + c5} where$c_(1), c_(2), c_(3), c_(4), c_(5)`are arotrary constant -

A. 5

B. 4

C. 3

D. 2

Answer: C

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11. The differential equation of co-axial system of circles $x^2 + y^2 - 4 + \lambda(2x + y - 5) = 0$ is

A. $\left(2 + \frac{dy}{dx}\right)(x^2 + y^2 - 4) - \left(2x + 2y\frac{dy}{dx}\right)(2x + y - 5) = 0$

B. $x^2 + y^2 - 4 + \frac{dy}{dx}(2x_y - 5) = 0$

C. $x^2 + y^2 - 4 + \left(2 + \frac{dy}{dx}\right)(2x + y - 5) = 0$

D. $(2x^2 + 2y^2 - 4) + \left(2x + 2y\frac{dy}{dx}\right) = 0$

Answer: A

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12. An integrating factor of the differential equation $\cos^2 x \frac{dy}{dx} - (\tan 2x)y = \cos^4 x$ is

A. $\frac{\cos x}{1 + \cos^2 x}$

B. $\frac{\cos 2x}{1 + \cos^2 x}$

C. $\frac{2\cos^2 x}{\cos 2x}$

D. $\frac{\cos 2x}{2\cos^2 x}$

Answer: D

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Exercise 1

1. The differential equation of the family of straight lines $y = mx + a/m$ where m is the parameter, is

A. $x\frac{dy}{dx} = a$

B. $(x - y)\frac{dy}{dx} = a$

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

D. $x\left(\frac{dy}{dx}\right)^2 - y\frac{dy}{dx} + a = 0$

Answer: D

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2. From the differential equation by eliminating the arbitrary constant from the equations $y = a(x-a)^2$

A. $\left(\frac{dy}{dx}\right)^3 - 4xy\frac{dy}{dx} + 8y^2 = 0$

B. $\left(\frac{dy}{dx}\right)^3 + 4xy\frac{dy}{dx} + 8y^2 = 0$

C. $\left(\frac{dy}{dx}\right)^3 - 4xy\frac{dy}{dx} - 8y^2 = 0$

D. $\left(\frac{dy}{dx}\right)^3 + 4xy\frac{dy}{dx} - 8y^2 = 0$

Answer: A

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3. If c is parameter then the differential equation whose solution is $y = c^2 + \frac{c}{x}$ is

A. $y = x^4\left(\frac{dy}{dx}\right) - x\left(\frac{dy}{dx}\right)^2$

B. $y = x^4\left(\frac{dy}{dx}\right)^2 + x\frac{dy}{dx}$

C. $y = x^4\left(\frac{dy}{dx}\right)^2 - x\frac{dy}{dx}$

D. $y = x^4\left(\frac{d^2y}{dx^2}\right) - x\frac{dy}{dx}$

Answer: C

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4. The differential equation whose solution is $y^2 = 4ax$, where a is an arbitrary constant, is

A. $\frac{dy}{dx} = \frac{y}{2x}$

B. $\frac{dy}{dx} = \frac{3y}{2x}$

C. $\frac{dy}{dx} = \frac{x}{2y}$

D. $\frac{dy}{dx} = \frac{2y}{x}$

Answer: A

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5. Form the differential equation by eliminating the arbitrary constant from the equation $y = a\cos(2x + b)$

A. $\frac{d^2y}{dx^2} + 4y = 0$

B. $\frac{d^2y}{dx^2} - 4y = 0$

C. $\frac{d^2y}{dx^2 + 2y = 0}$

D. $\frac{d^2y}{dx^2 + y = 0}$

Answer: A

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6. The differential equation whose solution is $y = ce^{-2x}$, where c is an arbitrary constant, is

A. $\frac{dy}{dx} - y = 0$

B. $\frac{dy}{dx} + y = 0$

C. $\frac{dy}{dx} + 2y = 0$

D. $\frac{dy}{dx} - 2y = 0$

Answer: C

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7. Form the differential equation by eliminating the arbitrary constant from $y = A\cos 3x + B\sin 3x$

A. $\frac{d^2y}{dx^2} + 9y = 1$

B. $\frac{d^2y}{dx^2} + 9y = 0$

C. $\frac{d^2y}{dx^2} - 9y = 0$

D. $\frac{dy^2}{dx^2} + y = 0$

Answer: B

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8. Form the differential equation by eliminating the arbitrary constant from the equation $y = a\cos x + b\sin x + x\sin x$

A. $\frac{d^2y}{dx^2} + y = 3\cos x$

B. $\frac{d^2y}{dx^2} + 2y = 2\cos x$

C. $\frac{d^2y}{dx^2} + y = 2\cos x$

D. $\frac{d^2y}{dx^3} - y = 2\cos x$

Answer: C

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9. The differential equation which represents the family of curves $y = c_1 e^{c_2 x}$, where c_1 and c_2 are arbitrary constants, is

A. $y'' = y\acute{y}$

B. $yy'' = y'$

C. $yy'' = (y')^2$

D. $y' = y^2$

Answer: C

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10. The differential equation whose solution is $y = Ae^{3x} + Be^{-3x}$, where A, B are arbitrary constant, is

A. $\frac{d^2y}{dx^2} = 9y$

B. $\frac{d^2y}{dx^2} = y$

C. $\frac{d^2y}{dx^2} = 3y$

D. $\frac{dy^2}{dx^2} = 2y$

Answer: A

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11. The differential equation obtained by eliminating the arbitrary constant a and b from $xy = ae^x + be^{-x}$ is

A. $x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} - xy = 0$

B. $\frac{d^2y}{dx^2} + 2y\frac{dy}{dx} - xy = 0$

C. $x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} - y = 0$

D. $\frac{d^2y}{dx^2} + \frac{dy}{dx} - xy = 0$

Answer: A

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12. Form the differential equation by eliminating a, b from $y = ae^{3x} + be^{4x}$

A. $\frac{d^2y}{dx^2} + 7\frac{dy}{dx} + 12y = 0$

B. $\frac{d^2y}{dx^2} - 7\frac{dy}{dx} - 12y = 0$

C. $\frac{d^2y}{dx^2} - 7\frac{dy}{dx} + 12y = 0$

D. $\frac{d^2y}{dx^2} + 7\frac{dy}{dx} + 12y = 0$

Answer: C

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13. Form the differential equation by eliminating the arbitrary constant from the equation $xy = ae^x + be^{-x} + x^2$

A. $x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + x^2 - xy = 2$

B. $x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + x^2 + xy = 2$

C. $x\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + x^2 - xy = 2$

D. $x\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + x^2 + xy = 2$

Answer: A

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14. $y = Ae^x + Be^{2x} + Ce^{2x}$ satisfies the differental equation

A. $y''' - 6y'' + 11y' - 6y = 0$

B. $y''' + 6y'' + 11y' + 6y = 0$

C. $y''' + 6y'' - 11y' + 6y = 0$

D. $y''' - 6y'' - 11y' + 6y = 0$

Answer: A

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15. The differential equation of the family $y = ae^x + bxe^x + vx^2e^x$ curves, where a, b, c are arbitrary constants, is :

A. $y''' + 3y'' + 3y' + y = 0$

B. $y''' + 3y'' - 3y' - y = 0$

C. $y''' - 3y'' - 3y' + y = 0$

D. $y''' - 3y'' + 3y' - y = 0$

Answer: D

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16. Let $p \in IR$, then the differential equation of the family of curves $y = (\alpha + \beta x)e^{px}$, where α, β are arbitrary constants, is

A. $y'' + 4py' + p^2y = 0$

B. $y'' - 2py' + p^2y = 0$

C. $y'' + 2py' - p^2y = 0$

D. $y'' + 2py' + p^2y = 0$

Answer: B

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17. Form the differential equation from $ax^2 + by^2 = 1$

A. $xyy_2 + xy_1^2 - yy_1 = 0$

B. $xyy_2 - xy_1^2 - yy_1 = 0$

C. $xyy_2 + xy_1^2 + yy_1 = 0$

D. $xyy_2 - xy_1^2 + yy_1 = 0$

Answer: A

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18. Form the differential equation by eliminating the arbitrary constant from the equation $x^2 + y^2 - 2ay - a^2 = 0$

A. $(2y^2 + x^2)\left(\frac{dy}{dx}\right)^2 + 4xy\frac{dy}{dx} + x^2 = 0$

B. $(2y^2 - x^2)\left(\frac{dy}{dx}\right)^2 + 4xy\frac{dy}{dx} + x^2 = 0$

C. $(2y^2 - x^2)\left(\frac{dy}{dx}\right)^2 - 4xy\frac{dy}{dx} + x^2 = 0$

D. $(2y^2 - x^2)\left(\frac{dy}{dx}\right)^2 - 4xy\frac{dy}{dx} - x^2 = 0$

Answer: B

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19. Form the differential equation by eliminating the arbitrary constant from the equation $x^2/a^2 + y^2/b^2 = 1$

A. $xy\frac{d^2y}{dx^2} + x\left(\frac{dy}{dx}\right)^2 - y\frac{dy}{dx} = 0$

B. $xy\frac{d^2y}{dx^2} + x\left(\frac{dy}{dx}\right)^2 + y\frac{dy}{dx} = 0$

C. $xy\frac{d^2y}{dx^2} - x\left(\frac{dy}{dx}\right)^2 - y\frac{dy}{dx} = 0$

D. $xy\frac{d^2y}{dx^2} - x\left(\frac{dy}{dx}\right)^2 + y\frac{dy}{dx} = 0$

Answer: A

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20. Form the differential equation by eliminating the arbitrary constant from the equation $x^2/a^2 - y^2/b^2 = 1$

A. $xy\frac{d^2y}{dx^2} + x\left(\frac{dy}{dx}\right)^2 + y\frac{dy}{dx} = 0$

B. $xy\frac{d^2y}{dx^2} + x\left(\frac{dy}{dx}\right)^2 - y\frac{dy}{dx} = 0$

C. $xy\frac{d^2y}{dx^2} - x\left(\frac{dy}{dx}\right)^2 - y\frac{dy}{dx} = 0$

D. $xy\frac{d^2y}{dx^2} - x\left(\frac{dy}{dx}\right)^2 + y\frac{dy}{dx} = 0$

Answer: B

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21. Form the differential equation by eliminating the arbitrary constant from the equation $(y-b)^2 = 4(x-a)$

A. $2\frac{d^2y}{dx^2} + \left(\frac{dx}{dy}\right)^3 = 0$

B. $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^3 = 0$

C. $2\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^3 = 0$

D. $2\frac{d^2y}{dx^2} - \left(\frac{dy}{dx}\right)^3 = 0$

Answer: C

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22. Form the differential equation by eliminating a,b from $(x-a)^2+(y-b)^2=r^2$

A. $\left(1-y_1^2\right)^3=r^2y_2^2$

B. $\left(1+y_1^2\right)^3=r^2y_2^2$

C. $\left(1+y_1^2\right)^3=r_2y^2$

D. none

Answer: B

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23. Form the differential equation by eliminating the arbitrary constant from the equation $y=ax^3+bx^2$

A. $x^2\frac{d^2y}{dx^2}-4x\frac{dy}{dx}-6y=0$

B. $\frac{d^2y}{dx^2}-4x\frac{dy}{dx}+6y=0$

C. $x^2\frac{d^2y}{dx^2} + 4x\frac{dy}{dx} + 6y = 0$

D. $x^2\frac{d^2y}{dx^2} - 4x\frac{dy}{dx} + 6y = 0$

Answer: D

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24. Form the differential equation by eliminating the arbitrary constant from the equation $y = ax^2 + be^{-x}$

A. $x(x+2)\frac{d^2y}{dx^2} + (x^2-2)\frac{dy}{dx} + 2(x+1)y = 0$

B. $x(x+2)\frac{d^2y}{dx^2} - (x^2-2)\frac{dy}{dx} - 2(x+1)y = 0$

C. $x(x+2)\frac{d^2y}{dx^2} + (x^2-2)\frac{dy}{dx} - 2(x+1)y = 0$

D. $x(x-2)\frac{d^2y}{dx^2} + (x^2-2)\frac{dy}{dx} - 2(x-1)y = 0$

Answer: C

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25. Form the differential equation by eliminating the arbitrary constant from the equation $y = e^x(a\cos 2x + b\sin 2x)$

A. $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 5y = 0$

B. $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + 5y = 0$

C. $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} - 5y = 0$

D. $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + 2\frac{dy}{dx} - 5y = 0$

Answer: A

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26. Form the differential equation by eliminating the arbitrary constant from the equation $y = e^{3x}(a\cos x + b\sin x)$

A. $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} - 10y = 0$

B. $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 10y = 0$

C. $\frac{d^2y}{dx^2} + 6\frac{dy}{dx} + 10y = 0$

D. $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 6y = 0$

Answer: B

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27. The differential equation of family of circles of fixed radius r and having their centres on y-axis is

A. $\left(\frac{dy}{dx}\right)^2 = \frac{x^2}{r^2 - x^2}$

B. $\left(\frac{dy}{dx}\right)^2 = \frac{x^2}{r^2 + x^2}$

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

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

Answer: A

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28. The differential equation of family of circles of fixed radius 5 units and centre on the line y = 2 is

A. $(y-2)y'^2 = 25-(y-2)^2$

B. $(y-2)^2y'^2 = 25-(y-2)^2$

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

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

Answer: B

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29. The differential equation of all circles passing through the origin and having their centres on the x-axis is

A. $x^2 = y^2 + xy\frac{dy}{dx}$

B. $x^2 = y^2 + 3xy\frac{dy}{dx}$

C. $y^2 = x^2 + 2xy\frac{dy}{dx}$

D. $y^2 = x^2 - 2xy\frac{dy}{dx}$

Answer: C

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30. The differential equation of family of curves $x^2 + y^2 - 2ay = 0$ where 'a' is arbitrary constant is

A. $2\left(x^2 - y^2\right)y' = xy$

B. $\left(x^2 + y^2\right)y' = 2xy$

C. $\left(x^2 - y^2\right)y' = 2xy$

D. $2\left(x^2 + y^2\right)y' = xy$

Answer: C

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31. The differential equation of the family of parabolas having vertices at the origin and foci on y-axis is

A. $\frac{dy}{dx} = \frac{2y}{x}$

B. $\frac{dy}{dx} = \frac{y}{2x}$

C. $\frac{dy}{dx} = \frac{y}{x}$

D. $\frac{dy}{dx} = \frac{2y}{x^2}$

Answer: A

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32. The differential equation of the family of parabola with focus at the origin and the X-axis as axis is

A. $y\left(\frac{dy}{dx}\right)^2 + 4x\frac{dy}{dx} = 4y$

B. $y\left(\frac{dy}{dx}\right)^2 = 2x\frac{dy}{dx} - y$

C. $y\left(\frac{dy}{dx}\right)^2 + y = 2x\frac{dy}{dx}$

D. $y\left(\frac{dy}{dx}\right)^2 + 2xy\frac{dy}{dx} + y = 0$

Answer: B

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33. The differential equation of the family of parabola with vertex at (0,-1) and having axis along the y-axis is

A. $xy' + y + 1 = 0$

B. $xy' - 2y - 2 = 0$

C. $xy' - y - 1 = 0$

D. $yy' + 2xy + 1 = 0$

Answer: B

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34. The differential equation of the family of ellipses having centres at the origin and whose axes are the coordinate axes is

A. $xy\frac{d^2y}{dx^2}+x\left(\frac{dy}{dx}\right)^2+y\frac{dy}{dx}=0$

B. $xy\frac{d^2y}{dx^2}-x\left(\frac{dy}{dx}\right)^2-y\frac{dy}{dx}=0$

C. $xy\frac{d^2y}{dx^2}+x\left(\frac{dy}{dx}\right)^2-y\frac{dy}{dx}=0$

D. $xy\frac{d^2y}{dx^2}-x\left(\frac{dy}{dx}\right)^2-y\frac{dy}{dx}=0$

Answer: C

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35. The differential equation of the family of hyperbolas having centres at the origin and whose axes are the coordinate axes is

A. $xy\frac{d^2y}{dx^2}+x\left(\frac{dy}{dx}\right)^2+y\frac{dy}{dx}=0$

B. $xy\frac{d^2y}{dx^2}-x\left(\frac{dy}{dx}\right)^2-y\frac{dy}{dx}=0$

C. $xy\frac{d^2y}{dx^2}+x\left(\frac{dy}{dx}\right)^2-y\frac{dy}{dx}=0$

D. $xy\frac{d^2y}{dx^2} - x\left(\frac{dy}{dx}\right)^2 - y\frac{dy}{dx} = 0$

Answer: C

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36. The order of the differential equation $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 0$ is

A. 1

B. 2

C. 3

D. 4

Answer: B

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37. The order of the differential equation $\left(\frac{dy}{dx}\right)^3 + \left(\frac{dy}{dx}\right)^2 + y^4 = 0$is

A. 4

B. 3

C. 1

D. 2

Answer: C

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38. The order of the differential equation $\left(\frac{dy}{dx}+3x\right)^{3/2}=x+3\frac{dy}{dx}$ is

A. 1

B. 2

C. 3

D. 4

Answer: A

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39. The order of the differential equation $\frac{d^2y}{dx^3} + 2\left(\frac{dy}{dx}\right)^4 + \frac{dy}{dx} = \cos x$ is

A. 3

B. 2

C. 4

D. 1

Answer: B

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40. The order of the differential equation $\left[2 + \left(\frac{dy}{dx}\right)^2\right]^{-3/2} = a\frac{d^2y}{dx^2}$ is

A. 3

B. 2

C. 4

D. 1

Answer: B

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41. The order of the differential equation $\left[\frac{d^2y}{dx^2}+\left(\frac{dy}{dx}\right)^2\right]^{-3/2}=k\frac{d^2y}{dx^2}$ is

A. 3

B. 2

C. 4

D. 1

Answer: B

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42. The degree and order of the differential equation of the family of all parabolas whose axis is x-axis, are respectively

A. 1, 2

B. 3, 2

C. 2, 3

D. 2,1

Answer: A

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43. The degree and order of D.E. of the family of rectangular hyperbolas whose axis of symmetry are the coordinates axes

A. 1, 1

B. 1, 2

C. 2, 1

D. 2, 2

Answer: A

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44. The differential equation representing the family of curves $y^2 = 2c\left(x + \sqrt{c}\right)$, where $c > 0$ is a parameter, is of order and degree as follows.

A. order 1, degree 2

B. order 1, degree 1

C. order 1, degree 3

D. order 2, degree 2

Answer: C

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45. The differential equation whose solution is $Ax^2 + By^2 = 1$, where A and B are arbitrary constant is of

A. first order and first degree

B. second order and first degree

C. second order and second degree

D. first order and second degree

Answer: B

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46. The differential equation of the family of curve $y = ax + \frac{1}{a}$, where $a \neq 0$ is an arbitrary constant, has the degree

A. 4

B. 3

C. 1

D. 2

Answer: D

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47. The solution of the differential equation $ydx - xdy = 0$ is

A. $y^2 = cx^3$

B. $y = cx^2$

C. $y = cx$

D. $y^2 = cx$

Answer: C

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48. The solution of the differential equation $ydx + xdy = 0$ is

A. $xy = c$

B. $x + y = c$

C. $x - y = c$

D. $x / y = c$

Answer: A

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49. The solution of the differential equation $\frac{dy}{dx} - \frac{2xy}{1+x^2} = 0$ is

A. $y = A\left(1 + x^2\right)$

B. $y = A\sqrt{1 + x^2}$

C. $y = A / \left(1 + x^2\right)$

D. $y = A / \sqrt{1 + x^2}$

Answer: A

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50. The solution of $\frac{dy}{dx} = \frac{2x}{3y^2}$ is

A. $y^3 + x^2 = c$

B. $y^3 - x^2 = c$

C. $y^3 - 2x^2 = c$

D. $2y^3 - 2x^2 = c$

Answer: B

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51. Let I be the purchase value of an equipment and V(t) be the value after it has been used for t years. The value V(t) depreciates at a rate given by differential equation $\frac{dV(t)}{dt} = -k(T - t)$, where $\hat{k} > 0$ is a constant

and T is the total life in years of the equipment. Then the scrap value V(t) of the equipment is

A. $l - \frac{k(T-t)^2}{2}$

B. e^{-kt}

C. $T^2 - \frac{l}{k}$

D. $l - \frac{kT^2}{2}$

Answer: D

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52. 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, the time at which the population becomes zero is

A. $\frac{1}{2}\ln 18$

B. $\ln 18$

C. 2 ln 18

D. ln 9

Answer: C

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53. 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

A. 3500

B. 4500

C. 2500

D. 300

Answer: A

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

A. $600 - 500e^{1/2}$

B. $400 - 300e^{-1/2}$

C. $400 - 300e^{1/2}$

D. $300 - 200e^{-1/2}$

Answer: C

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55. If $\frac{dy}{dx} = y + 3 > 0$ and y(0) =2, then y (ln 2) is equal to :

A. 13

B. -2

C. 7

D. 5

Answer: C

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56. The solution of $x^2 + y^2 \frac{dy}{dx} = 4$ is

A. $x^2 + y^2 = 12x + c$

B. $x^2 + y^2 = 3x + c$

C. $x^3 + y^3 = 3x + c$

D. $x^3 \_ y^3 = 12x + c$

Answer: A

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57. The solution of $2xy\frac{dy}{dx} = 1 + y^2$ is

A. $1 - y^2 = cx$

B. $1 + y^2 = cx$

C. $1x^2 = cy$

D. $1 + x^2 = cy$

Answer: B

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58. The general solution of $\frac{dy}{dx} + \frac{\sqrt{1-y^2}}{\sqrt{1-x^2}} = 0$ is

A. $\sin^{-1} 2x + \sin^{-1} 2y = c$

B. $\sin^{-1} x - \sin^{-1} y = c$

C. $\tan^{-1} x + \tan^{-1} y = c$

D. $\sin^{-1} x + \sin^{-1} y = c$

Answer: D

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59. The solution of $x^2 \frac{dy}{dx} = \sqrt{4 - y^2}$ is

A. $\cos^{-1}(y/2) + 1/x = c$

B. $\tan^{-1}(y/2) + 1/x = c$

C. $\sin^{-1}(y/2) = 1/x = c$

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

Answer: D

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60. The general solution of $\frac{dy}{dx} + \frac{\sqrt{1 - y^2}}{\sqrt{1 - x^2}} = 0$ is

A. $\sinh^{-1} x + \sinh^{-1} y = c$

B. $\sinh^{-1} x - \sinh^{-1} y = c$

C. $\tanh^{-1} x + \tanh^{-1} y = c$

D. $\tanh^{-1} x - \tanh^{-1} y = c$

Answer: A

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61. The general solution of $x\sqrt{1+y^2}dx + y\sqrt{1+x^2}dy = 0$ is

A. $\sqrt{1+x^2} - \sqrt{1+y^2} = c$

B. $\sqrt{1+x^2} + \sqrt{1+y^2} = c$

C. $\sqrt{1-x^2} + \sqrt{1+y^2} = c$

D. $\sqrt{1+x^2} + \sqrt{1-y^2} = c$

Answer: B

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62. The solution of $x\sqrt{1-y^2}dx + y\sqrt{1-x^2}dy = 0$ is

A. $\sqrt{1+x^2} + \sqrt{1-y^2} = c$

B. $\sqrt{1-x^2} - \sqrt{1-y^2} = c$

C. $\sqrt{1-x^2} + \sqrt{1-y^2} = c$

D. $\sqrt{1-x^2} + \sqrt{1+y^2} = c$

Answer: C

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63. The solution of $\sqrt{1+x^2}dx + \sqrt{1+y^2}dy = 0$ is

A. $x\sqrt{1+x^2} + y\sqrt{1+y^2} + \sinh^{-1}x + \sinh^{-1}y = c$

B. $x\sqrt{1+x^2} + y\sqrt{1+y^2} = c$

C. $x\sqrt{1+x^2} - y\sqrt{1+y^2} + \sinh^{-1}x - \sinh^{-1}y = c$

D. $\sinh^{-1}x + \sinh^{-1}y = c$

Answer: A

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64. The solution of $\frac{dy}{dx} + \frac{y^2 + y + 1}{x^2 + x + 1} = 0$ is

A. $\tan^{-1}(2x + 1) + \tan^{-1}(2y + 1) = c$

B. $\frac{\tan.^{-1}(2x + 1)}{\sqrt{3}} + \frac{\tan.^{-1}(2y + 1)}{\sqrt{3}} = c$

C. $\frac{\tan.^{-1}(2x)}{\sqrt{3}} + \frac{\tan.^{-1}(2y)}{\sqrt{3}} = c$

D. $\frac{\tan.^{-1}(2x - 1)}{\sqrt{3}} + \frac{\tan.^{-1}(2y - 1)}{\sqrt{3}} = c$

Answer: B

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65. The solution of the differential equation $\frac{dy}{dx} = \frac{xy + y}{yx + x}$ is

A. $x + y = \log\left(\frac{cy}{x}\right)$

B. $x + y = \log(cxy)$

C. $x - y = \log\left(\frac{cx}{y}\right)$

D. $y - x = \log\left(\frac{cx}{y}\right)$

Answer: D

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66. The solution of $\frac{dy}{dx} = \frac{x + x^2}{y + y^2}$ is

A. $2\left(x^3 - y^3\right) + 3\left(x^2 - y^2\right) = c$

B. $2\left(x^3 - y^3\right) - 3\left(x^2 - y^2\right) = c$

C. $2\left(x^3 + y^3\right) + 3\left(x^2 - y^2\right) = c$

D. $2\left(x^3 + y^3\right) + 3\left(x^2 + y^2\right) = c$

Answer: A

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67. The solution of $e^{x-y}dx + e^{y-x}dy = 0$ is

A. $e^{2x} - e^{2y} = c$

B. $e^{2x} + e^{2y} = c$

C. $e^{x} + e^{y} = c$

D. $e^{x} - e^{y} = c$

Answer: B

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68. The solution of $\frac{dy}{dx} = e^{2x-y} + x^3 e^{-y}$ is

A. $4e^{y} = 2e^{2x} - x^4 + c$

B. $4e^{y} = 2e^{2x} + x^4 - x^2 + c$

C. $4e^{y} = 2e^{2x} + x^4 + c$

D. $4e^{y} = 2e^{2x} - x^4 + x^2 = c$

Answer: C

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69. The general solution of $\tan y \sec^2 x dx + \tan x \sec^2 y dy = 0$ is

A. $\tan x + \tan y = c$

B. $\tan x / \tan y = c$

C. $\tan x \tan y = c$

D. $\tan x - \tan y = c$

Answer: C

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70. If y = y (x) is the solution of the differential equation $\left(\frac{2+\sin x}{y+1}\right)\frac{dy}{dx} + \cos x = 0$ with y(0) = 1 then $y\left(\frac{\pi}{2}\right)$=

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. 1

D. $\frac{4}{3}$

Answer: A

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71. The solution of $e^x \cot y dx + (1 - e^x)\cos ec^2 y dy = 0$ is

A. $(e^x + 1)\cot y = c$

B. $(e^x - 1)\cot y = c$

C. $(2e^x - 1)\cot y = c$

D. $(e^x - 2)\cot y = c$

Answer: B

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72. The solution of $(e^x + 1)ydy + (y + 1)dx = 0$ is

A. $e^{x+y} = c(y + 1)(e^x + 1)$

B. $e^{x+y} = c(y + 1)(e^x - 1)$

C. $e^{x+y} = c(y - 1)(e^x + 1)$

D. $e^{x+y} = e(y - 1)(e^x - 1)$

Answer: A

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73. The solution of $e^x \tan ydx + (1 - e^x)\sec^2 ydy = 0$ is

A. $\tan y = c(1 + e^x)$

B. $\tan y = c(e^x - 1)$

C. $\tan y = c(1 - e^x)^2$

D. $\cos y = c(1 - e)$

Answer: B

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74. The solution of $3e^x \cos^2 y dx + (1 + e^x)\cot y dy = 0$ is

A. $\tan y = c(e^x - 1)^3$

B. $\tan y = c(e^x + 1)^3$

C. $\tan y = c(e^x - 1)^2$

D. $\cos y = c(e^x - 1)^3$

Answer: A

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75. The solution of $ydx - xdy + 3x^2y^2e^x dx = 0$ is

A. $\frac{y}{x} + e^{x^3} = c$

B. $\frac{x}{y} - e^{x^3} = c$

C. $\frac{x}{y} + e^{x^3} = c$

D. $\frac{y}{x} - e^{x^3} = c^3$

Answer: C

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76. The solution of $\left(x^2 - y^2x^2\right)\frac{dy}{dx} + \left(y^2 + x^2y^2\right) = 0$ is

A. $x + \frac{1}{x} + y + \frac{1}{y} + c = 0$

B. $x - \frac{1}{x} + y - \frac{1}{y} = c$

C. $x + \frac{1}{x} - y - \frac{1}{y} + c = 0$

D. $x - \frac{1}{x} - y - \frac{1}{y} = c$

Answer: A

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77. The solution of $(xy^2 + x)dx + (yx^2 + y)dy = 0$ is

A. $(x^2 + 1)(y^2 - 1) = c$

B. $(x^2 - 1)(y^2 + 1) = c$

C. $(x^2 + 1)(y^2 + 1) = c$

D. $(x^2 - 1)(y^2 - 1) = c$

Answer: C

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78. The solution of $xdx + ydy = x^2ydy - xy^2dx$ is

A. $x^2 - 1 = c(1 + y^2)$

B. $x^2 + 1 = c(1 - y^2)$

C. $x^3 - 1 = c(1 + y^3)$

D. $x^3 + 1 = c(1 - y^3)$

Answer: A

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79. The solution of $\frac{dy}{dx} = 2xy - 2y + 2x - 3$ is

A. $e^{x^2+3x} = c(y + 1)$

B. $e^{x^2-3x} = c(2y + 1)$

C. $e^{x^2-3x} = c(y - 1)$

D. $e^{x^2-3x} = c(y + 1)$

Answer: D

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80. The solution of $\frac{dy}{dx} + \frac{x(1+y^3)}{y^2(1+x^2)} = 0$ is

A. $\left(1+x^2\right)^3\left(1+y^3\right)^2=c$

B. $\left(1-x^2\right)^3\left(1+y^3\right)^2=c$

C. $\left(1+x^2\right)^3\left(1-y^3\right)^2=c$

D. $\left(1-x^2\right)^3\left(1-y^3\right)^2=c$

Answer: A

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81. The solution of $\left(1-x^2\right)\frac{dy}{dx}+xy=5x$ is

A. $y+5=c\sqrt{x^2+1}$

B. $y+5=c\sqrt{x^2-1}$

C. $y-5=c\sqrt{1-x^2}$

D. $y-5=c\sqrt{x^2+1}$

Answer: C

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82. The solution of $\left(x^2y^3+x^2\right)+\left(y^2x^3+y^2\right)dy=0$ is

A. $\left(x^3+1\right)\left(y^3+1\right)=c$

B. $\left(x^3-1\right)\left(y^3-1\right)=c$

C. $\left(x^3-1\right)\left(y^3+1\right)=c$

D. $\left(x^3+1\right)\left(y^3-1\right)=c$

Answer: A

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83. The solution of the differential equation $ydx+\left(x+x^2y\right)dy=0$ is

A. $-\frac{1}{xy}=c$

B. $\log y=cx$

C. $\frac{1}{xy}+\log y=c$

D. $-\frac{1}{xy}+\log y=c$

Answer: D

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84. $dx+dy=(x+y)(dx-dy)\Rightarrow \log(x+y)$ =

A. $x+y+c$

B. $x+2y+c$

C. $x-y+c$

D. $2x+y+c$

Answer: C

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85. The solution of the differenital equation $\frac{dy}{dx} = \frac{x+y}{x}$ satisfying the condition y(1) = 1 is

A. $y = x \ln x + x^2$

B. $y = xe^{(x-1)}$

C. $y = x \ln x + x$

D. $y = \ln x + x$

Answer: C

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86. The solution of $\frac{dy}{dx} + 1 = e^{x+y}$ is

A. $e^{-(x+y)} + x + c = 0$

B. $e^{-(x+y)} - x + c = 0$

C. $e^{-(x+y)} + x + c = 0$

D. $e^{-(x+y)} - x + c = 0$

Answer: A

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87. The solution of $\frac{dy}{dx} = (x-y)^2$ is

A. $(x-y+1) = c(1-x+y)e^{2x}$

B. $(x+y+1) = c(1-x+y)e^{2x}$

C. $(x-y+1) = c(1-x-y)e^{2x}$

D. $(x+y+1) = c(1+x+y)e^{2x}$

Answer: A

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88. The solution of $\frac{dy}{dx} = (3x+y+4)^2$ is

A. $3x + y - 4 = \sqrt{3}\tan\left(\sqrt{3}x + c\right)$

B. $3x + y + 4 = \sqrt{3}\tan(x + c)$

C. $3x + y = 4 = \sqrt{3}\tan\left(\sqrt{3}x + c\right)$

D. $3x + y + 4 = \sqrt{3}\tan(2x + c)$

Answer: C

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89. The equation of the cure passing through the origin and satisfying the differential equation $\frac{dy}{dx} = (x - y)^2$ is

A. $e^{2x}(1 - x + y) = 1 + x - y$

B. $e^{2x}(1 + x - y) = 1 - x + y$

C. $e^{2x}(1 - x + y) = -(1 + x + y)$

D. $e^{2x}(1 + x + y) = 1 - x + y$

Answer: A

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90. The solution of $(x+y+1)\frac{dy}{dx}=1$ is

A. $y=(x+2)+ce^{x}$

B. $y=-(x+2)+ce^{x}$

C. $x=-(y+2)+ce^{y}$

D. $x=(y+2)^{2}+ce^{x}$

Answer: C

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91. Solve $\frac{dy}{dx}-x\tan(y-x)=1$

A. $ce^{x^{2}/2}=\sin(y-x)$

B. $ce^{x^{2}/2}=\sin(y+x)$

C. $ce^{x^{2}/2}=\sin(y-x)^{2}$

D. $ce^{x^2/2} = \cos(y - x)$

Answer: A

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92. $\frac{dy}{dx} + 2x \tan(x - y) = 1 \Rightarrow \sin(x - y) =$

A. Ae^{-x^2}

B. Ae^{2x}

C. Ae^{x^2}

D. Ae^{-2x}

Answer: C

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93. The solution of $\frac{dy}{dx} = \sec(x + y)$ is

A. $\sec(x-y)+\tan(x+y)=ce^{2x+y}$

B. $y=c+\tan.\dfrac{x+y}{2}$

C. $\sec(x+y)+\tan(x-y)=ce^{2x+y}$

D. $\sec(x-y)+\tan(x-y)=ce^{2x+y}$

Answer: B

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94. The solution of $\dfrac{dy}{dx}=\tan^2(x+y)$ is

A. $\sin(2x+2y)=2x+2y+c$

B. $\sin(2x-2y)-2x-2y+c$

C. $\sin(2x+2y)=2x-2y+c$

D. $\sin(2x-2y)=2x+2y+c$

Answer: C

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95. The solution of $\tan y \frac{dy}{dx} = \sin(x+y) + \sin(x-y)$ is

A. $\sec y = 2\cos x + c$

B. $\sec y = -2\cos x + c$

C. $\tan y = -2\cos x + c$

D. $\sec^2 y = -2\cos x + c$

Answer: B

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96. The solution of the differential equation $\frac{dy}{dx} = \sin(x+y)\tan(x+y) - 1$ is

A. $\cos ec(x+y) + \tan(x+y) = x + c$

B. $x + \cos ec(x+y) = c$

C. $x + \tan(x+y) = c$

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

Answer: B

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97. A particular solution of $\frac{dy}{dx} = \frac{x(2\log x + 1)}{\sin y + y\cos y}$ is

A. $y\sin y = x\log x$

B. $y^2\sin y = x\log x$

C. $y\sin y = x^2\log x$

D. none

Answer: C

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98. The differential equation $y\frac{dy}{dx} + x = a$ represents

A. a set of circles whose centres are on the x-axis

B. a set of circles whose centres are on the y-axis

C. a set of parabolas

D. a set of ellipses

Answer: A

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99. If the subnormal at every point of a curve is a constant k, then its equation is

A. $y^2 = kx$

B. $y^2 = 2kx$

C. $y^2 = 2kx + c$

D. none

Answer: C

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100. The family of curves , in which the subtangent at any point to any curve is double the abscissa, is given by

A. $x = cy^2$

B. $y = cx^2$

C. $x^2 = cy^2$

D. $y = cx$

Answer: A

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101. The curve whose subtangent is twice the abscissa of the point of contact and passing through (1,2) is

A. $y^2 = 4x$

B. $y^2 = -4x$

C. $x^2 = 4y$

D. $x^2 = -4y$

Answer: A

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102. If the length of the subtangent at any point of a curve is constant , then the curve is

A. $y^2 = 2kx + c$

B. $y = be^{x/a}$

C. $x^2 = 2ky + c$

D. none

Answer: B

View Text Solution

103. The normal to a curve at P(x,y) meets the x-axis at G. If the distance of G from the origin is twice the abscisa of P, then the curve is a

A. ellipse

B. parabola

C. circle

D. hyperbola

Answer: D

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104. Equation of the curve passing through the point (4,3) and having slope $= y/2$ at a point (x,y) on it is

A. $\log\left(\frac{y}{3}\right) = \frac{x}{2} - 2$

B. $\log\left(\frac{y}{3}\right) = \frac{x}{2} + 2$

C. $y = 3e^{x-2}$

D. $y^2 = x + 5$

Answer: A

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105. The slope of a curve at any point on it is the reciprocal of twice the ordinate at that point. If the curve passes through (4,3) then its equation is

A. $y^2 = x$

B. $4y^2 + 9x$

C. $y^2 = 2x + 1$

D. $y^2 = x + 5$

Answer: D

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106. The subnormal at any point of a curve is of constant length '8'. Then the differential equation of the family of curve is

A. $\frac{dy}{dx} = 8y$

B. $y\frac{dy}{dx} = 8$

C. $y\sqrt{1+\left(\frac{dy}{dx}\right)^2} = 8$

D. $y\sqrt{1+\left(\frac{dy}{dx}\right)^2} = 8\frac{dy}{dx}$

Answer: C

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107. The equation of curve passing through (1,3) whose slope at any point (x,y) on it is y/x^2 is given by

A. $y = 3e^{-1/x}$

B. $y = 3e^{1-1/x}$

C. $y = ce^{1/x}$

D. $y = 3e^{1/x}$

Answer: B

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108. The equation of curve passing through (0,1) which is a solution of differential equation $\left(1+y^2\right)dx + \left(1+x^2\right)dy = 0$ is given by

A. $\tan^{-1}x + \tan^{-1}y = 0$

B. $\tan^{-1}x + \tan^{-1}y - \frac{\pi}{4} = 0$

C. $\sin g^{-1}x + \sin g^{-1} = 0$

D. $\sinh^{-1}x \sinh^{-1}y + \log\left(1+\sqrt{2}\right) = 0$

Answer: A

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109. The equation of curve passing through ( ) satisfying the differential equation $e^x \tan y dx + (1 + e^x)\sec^2 y dy = 0$ is given by

A. $(1 + e^x)\tan y = 2$

B. $1 + e^x = 2\tan y$

C. $1 + e^x = 2\sec y$

D. $(1 + e^x)\tan y = k$

Answer: D

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110. The equation of curve passing through (pi^2/4,1), which has a solution of the equation as $y^2 \cos\sqrt{x}dx - 2\sqrt{x}e^{1/y}dy = 0$ is

A. $\sin\sqrt{x} + e^{1/y} = e$

B. $\sin\sqrt{x} - e^{1/y} = 1 - e$

C. $\sin\sqrt{x} = 1 + e + e^{1/y}$

D. $\sin\sqrt{x} + e^{1/y} = 1 + e$

Answer: D

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111. The solution of $\left(x^2 + y^2\right)dx = 2xydy$ is

A. $c\left(x^2 - y^2\right) = x$

B. $c\left(x^2 + y^2\right) = x$

C. $c\left(x^2 - y^2\right) = y$

D. $c\left(x^2 + y^2\right) = y$

Answer: A

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112. The solution of $\frac{dy}{dx} = \frac{xy}{x^2 + y^2}$ is

A. $x = ce^{2x^2/2y^2}$

B. $y = ce^{2x^2/2y^2}$

C. $y = ce^{x^2/2y^2}$

D. $x = ce^{x^2/2y^2}$

Answer: C

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113. The solution of $\frac{dy}{dx} = \frac{2xy}{x^2 - y^2}$ is

A. $x^2 + y^2 = cy$

B. $x^2 - y^2 = cy$

C. $x^2 - y^2 = cx$

D. $x^2 - y^2 = c/y$

Answer: A

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114. The solution of $\left(x^2 - y^2\right)dx + 2xydy = 0$ is

A. $x^2 + y^2 = cx$

B. $x^2 - y^2 = cx$

C. $x^2 + y^2 = cy$

D. $x^2 + y^2 = cx^2$

Answer: A

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115. The solution of $\frac{dy}{dx} = \frac{y + \sqrt{x^2 + y^2}}{x}$ is

A. $y + \sqrt{x^2 + y^2} = cx^2$

B. $y + \sqrt{x^2 + y^2} = cy^2$

C. $y - \sqrt{x^2 + y^2} = cx^2$

D. $y+\sqrt{x^2-y^2}=cx^2$

Answer: A

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116. The solution of $xdy-ydx=\sqrt{x^2+y^2}dx$ is

A. $y+\sqrt{x^2+y^2}=cy^2$

B. $y+\sqrt{x^2+y^2}=cx^2$

C. $y+\sqrt{x^2-y^2}=cx^2$

D. $y-\sqrt{x^2+y^2}=vx^2$

Answer: B

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117. The solution of $\frac{dy}{dx}=\frac{y^2-2xy}{x^2-2xy}$ is

A. $xy(y+x)=c$

B. $xy(y-x)=c$

C. $xy(x-y)=c$

D. $y(y-x)=c$

Answer: B

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118. The solution of $\frac{dy}{dx}=\frac{3x^2y-y^3}{3y^2x-x^3}$ is

A. $x\left(y^3-x^2y\right)=c$

B. $y\left(y^3-x^3\right)=c$

C. $x\left(y^3+x^3\right)=c$

D. $y\left(y^3+x^3\right)=c$

Answer: A

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119. The solution of the differential equation $xy^2 - \left(x^3 + y^3\right)dx = 0$ is

A. $y^2 = 3x^3 + c$

B. $y^3 = 3x^3 \log(cx)$

C. $y^3 = 3x^3 + \log(cx)$

D. $y^3 + 3x^3 = \log(cx)$

Answer: B

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120. The solution of $\frac{dy}{dx} = \frac{y^2}{xy - x^2}$ is

A. $e^{y/x} = kx$

B. $e^{y/x} = ky$

C. $e^{-y/x} = kx$

D. $e^{-y/x} = ky$

Answer: B

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121. The solution of $\frac{dy}{dx} = \frac{(x+y)^2}{2x^2}$ is

A. $\tan^{-1}\left(\frac{y}{x}\right) = \frac{1}{2}\log cx$

B. $\tan^{-1}\left(\frac{x}{y}\right) = \frac{1}{2}\log cx$

C. $\tan^{-1}\left(\frac{y}{x}\right) = \frac{1}{2}\log cy$

D. $\tan^{-1}\left(\frac{y}{x}\right) = \frac{1}{3}\log cx$

Answer: A

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122. The solution of $xdx + ydy = 2(xdy - ydx)$ is

A. $2\cos^{-1}\left(\frac{y}{x}\right) = \log c\sqrt{x^2+y^2}$

B. $2\tan^{-1}\left(\frac{y}{x}\right) = \log c\sqrt{x^2-y^2}$

C. $2\tan^{-1}\left(\frac{y}{x}\right) = \log c\sqrt{x^2+y^2}$

D. $2\tan^{-1}\left(\frac{x}{y}\right) = \log c\sqrt{x^2+y^2}$

Answer: C

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123. The solution of $\frac{dy}{dx} = \frac{x-y}{x+y}$ is

A. $x^2 - 2xy - y^2 = c$

B. $x^2 - 2xy + y^2 = c$

C. $x^2 + 2xy - y^2 = c$

D. $x^2 + 2xy - y^2 = c$

Answer: A

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124. The solution of $\frac{dy}{dx} = \frac{2x - y}{2y - x}$ is

A. $(y + x)(y + x)^3 = cx^4 e^{--4x}$

B. $(y - x)(y + x)^3 = cx^4 e^{-4x}$

C. $(y - x)(y - x)^3 = cx^4 e^{-4x}$

D. $(y + x)(y - x)^3 = cx^4 e^{-4x}$

Answer: B

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125. The solution of the differential equation $3xy' - 3y + \left(x^2 - y^2\right)^{1/2} = 0$, satisfying the condition y(1) = 1 is

A. $3\cos^{-1}\left(\frac{y}{x}\right) = \ln|x|$

B. $3\cos\left(\frac{y}{x}\right) = \ln|x|$

C. $3\cos^{-1}\left(\frac{y}{x}\right) = 2\ln|x|$

D. $3\sin^{-1}\left(\frac{y}{x}\right) = \ln|x|$

Answer: A

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126. The solution of the differential equation $\frac{dy}{dx} = \frac{y}{x} + \frac{\varphi(y/x)}{\varphi'(y/x)}$ is

A. $x\varphi\left(\frac{y}{x}\right) = k$

B. $\varphi\left(\frac{y}{x}\right) = kx$

C. $y\varphi\left(\frac{y}{x}\right) = k$

D. $\varphi\left(\frac{y}{x}\right) = ky$

Answer: B

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127. The solution of $\frac{dy}{dx} = \frac{y + x\tan.\frac{y}{x}}{x} \Rightarrow \sin.\frac{y}{x} =$

A. cx^2

B. cx

C. cx^3

D. cx^4

Answer: B

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128. Solve : $xdy = \left(y + x \ \cos^2 \frac{y}{x}\right)dx$

A. $\tan. \frac{y}{x} = \log(cx)$

B. $\tan. \frac{y}{x} = \log(cy)$

C. $\tan. \frac{x}{y} = \log(cx)$

D. $\cos. \frac{y}{x} = \log(cx)$

Answer: A

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129. Solve : $x \sin\frac{y}{x}.\frac{dy}{dx} = y \sin\frac{y}{x} - x$

A. $e^{y/x} = cy$

B. $e^{\cos(y/x)} = cx$

C. $e^{x/y} = cx$

D. $e^{2y/2x} = cx$

Answer: B

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130. The solution of $x\frac{dy}{dx} = y + xe^{y/x}$ with $y(1) = 0$ is

A. $e^{-y/x} m \log x$

B. $e^{-y/x} + 2\log x = 1$

C. $e^{-y/x} + \log x = 1$

D. $e^{y/x} + \log x = 1$

Answer: C

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131. The solution of the differential equation $xy' = 2xe^{-y/x} + y$ is

A. $e^{y/x} + \ln|ex| = 0$

B. $e^{-y/x}x + e$

C. $e^{y/x} = \ln|ax|$

D. $e^{y/x} = 2\ln|ax|$

Answer: D

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132. The solution of $\left(1 + e^{x/y}\right)dx + e^{x/y}(1 - x/y)dy = 0$ is

A. $ye^{y/x} + x = c$

B. $ye^{x/y} - x = c$

C. $ye^{x/y} + y = c$

D. $ye^{x/y} + x = c$

Answer: D

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133. The solution of $x \cos. \frac{y}{x}(ydx + xdy) = y \sin. \frac{y}{x}(xdy - ydx)$ is

A. $cxy \cos(2y/x) = 1$

B. $cxy \cos(x/y) = 1$

C. $cxy \cos(y/x) = 1$

D. $cxy \cos(y/x) = 2$

Answer: C

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134. If $x\frac{dy}{dx} = y(\log y - \log x + 1)$, then the solution of the equation is

A. $y\log\left(\frac{x}{y}\right) = cx$

B. $x\log\left(\frac{y}{x}\right) = cy$

C. $\log\left(\frac{y}{x}\right) = cx$

D. $\log\left(\frac{x}{y}\right) = cy$

Answer: C

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135. The solution of $(12x + 5y - 9)dx + (dx + 2y - 4)dy = 0$ is

A. $6x^2 + 5xy + y^2 + 9x + 4y = c$

B. $6x^2 + 5xy + y^2 - 9x - 4y = c$

C. $6x^2 - 5xy - y^2 - 9x - 4y = c$

D. $3x^2 + 5xy + 2y^2 - 9x - 4y = c$

Answer: B

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136. The solution of $\frac{dy}{dx} = \frac{x - 2y + 3}{2x - y + 5}$ is

A. $x^2 - 4xy + y^2 + 6x - 10y = c$

B. $x^2 - 4xy + y^2 - 9x - 4y = c$

C. $x^2 + 4xy + y^2 + 6x - 10y = c$

D. $x^2 - 4xy - y^2 - 6x - 10y = c$

Answer: A

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137. The solution of $\frac{dy}{dx} = \frac{x + y + 1}{x + y - 1}$ is

A. $e^{y-x} = c(x+y)$

B. $e^{y-x} = c(x-y)$

C. $e^{y+x} = c(x+y)$

D. $e^{y-x} = c(2x+y)$

Answer: A

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138. Solve $\frac{dy}{dx} = \frac{x-2y+1}{2x-4y}$

A. $(x-2y)^2 - 2x = c$

B. $(x-2y)^2 + 2x = c$

C. $(x+2y)^2 + 2x = c$

D. $(x-2y)^2 - 2x = c$

Answer: B

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139. The solution of the different equation $(2x - 4y + 3)\frac{dy}{dx} + (x - 2y + 1) = 0$ is

A. $\log[(2x - 4y) + 3] = x - 2y + c$

B. $\log[2(2x - 4y) + 3] = 2(x - 2y) + c$

C. $\log[2(x - 2y) + 5] = 2(x + y) + c$

D. $\log[4(x - 2y) + 5] = 4(x + 2y) + c$

Answer: D

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140. The solution of $\frac{dy}{dx} = \frac{x + 7y + 2}{3x + 5y + 6}$ is

A. $(y + x + 2)^4 = c(x + 5y + 2)$

B. $(y - x02)^4 = c(x - 5y - 2)$

C. $(y - x - 2)^4 = c(x + 5y + 2)$

D. $(y-x-2)^4 = c(x-5y-2)$

Answer: C

View Text Solution

141. Solve the following differential equations.

$$\frac{dy}{dx} + \frac{10x+8y-12}{7x+5y-9} = 0$$

A. $(x+y+1)^2(2x+y+3)^3 = c$

B. $(x+y-1)^2(2x+y-3)^3 = c$

C. $(x+y+1)^2(2x+y+3)^3 = c$

D. $(x-y-1)^2(2x+y-3)^3 = c$

Answer: B

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142. The solution of $(x+y+1)dx+(3x+4y+4)dy=0$ is

A. $x-2y-2=ce^{x/(2x+4y+4)}$

B. $x+2y-3=ce^{x/(2x+4y+4)}$

C. $x+2y+2=ce^{x/(2x+4y+4)}$

D. $x-2y+2=ce^{x/(2x+4y+4)}$

Answer: C

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143. The solution of $(3y-7x+7)dx+(7y-3x+3)dy=0$ is

A. $(y-x'+1)^2(y+x+1)^5=c$

B. $(y-x+1)^2(y-x-1)^5=c$

C. $(y-x-1)^2(y+x-1)^5=c$

D. $(y-x+1)^2(y+x-1)^5=c$

Answer: D

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144. The solution of $\frac{dy}{dx} = \frac{x + 2y - 3}{2x + y - 3}$ is

A. $x + y + 2 = c(x - y)^3$

B. $x - y - 2 = c(x - y)^3$

C. $x + y - 2 = c(x - y)^3$

D. $x + y - 2 = c(x + y)^3$

Answer: C

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145. Integrating factor of $\sin x \frac{dy}{dx} + y \cos x = \sin 2x$ is

A. cos x

B. sin x

C. $-\sin x$

D. $-\cos x$

Answer: B

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146. Integrating factor of $\frac{dy}{dx} + \left(\frac{x \sin x + \cos x}{x \cos x}\right) y = \frac{1}{x \cos x}$ is

A. x cos x

B. x sin x

C. x sec x

D. x cosec x

Answer: C

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147. Integrating factor of $\frac{dy}{dx} - \frac{2}{x+1}y = (x+1)^2$ is

A. cos x

B. log sec x

C. sec x

D. $(x+1)^{-2}$

Answer: D

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148. Integrating factor of the differential equation $(1-x^2)\frac{dy}{dx} + xy = \frac{x^4\left(\sqrt{1-x^2}\right)^3}{(1+x^5)}$ is

A. $\sqrt{1-x^2}$

B. $\frac{x}{\sqrt{1-x^2}}$

C. $\frac{x^2}{\sqrt{1-x^2}}$

D. $\frac{1}{\sqrt{1-x^2}}$

Answer: D

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149. An integrating factor of the equation $\left(1+y+x^2y\right)dx+\left(x+x^3\right)dy=0$ is

A. e^x

B. x^2

C. $\frac{1}{x}$

D. x

Answer: D

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150. The solution of $\frac{dy}{dx} + \frac{3x^2y}{1+x^3} = \frac{\sin^2 x}{1+x^3}$ is

A. $2y(1+x^3) = x + \sin x \cos x + c$

B. $2y(1-x^3) = x + \sin x \cos x + c$

C. $2y(1+x^3) = x - \sin x \cos x + c$

D. $2y(1-x^3) = x - \sin x \cos x + c$

Answer: C

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151. The solution of $(x^2-1)\frac{dy}{dx} + 2xy = 1$ is

A. $y(x^2-1) = x + c$

B. $y(x^2-1) = x^2 + c$

C. $y(x^2+1) = x + c$

D. $y(x^2-1) = x^2 + c$

Answer: A

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152. The solution of $\left(x^2+1\right)\frac{dy}{dx}+4xy=\frac{1}{x^2+1}$ is

A. $y\left(x^2-1\right)^2=x+c$

B. $y\left(x^2+1\right)^2=x+c$

C. $y\left(x^2+1\right)^2=x^2+c$

D. $y\left(x^2-1\right)^2=x^2+c$

Answer: B

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153. The solution of $\left(1+x^2\right)\frac{dy}{dx}+2xy-4x^2=0$ is

A. $3x\left(1-y^2\right)=4y^3+c$

B. $3y\left(1+x^2\right)=4x^3+c$

C. $3x\left(1-y^2\right)=4y^3+c$

D. $3y\left(1+y^2\right)=4x^3+c$

Answer: B

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154. The solution of $\left(1-x^2\right)\frac{dy}{dx}+2xy=x\sqrt{1-x^2}$ is

A. $\frac{y}{1-x^2}=\frac{1}{\sqrt{1-x^2}}+c$

B. $\frac{y}{1+x^2}=\frac{1}{\sqrt{1+x^2}}+c$

C. $\frac{y}{1+x^2}=\frac{1}{\sqrt{1+x^2}}+c$

D. $\frac{y}{1+x^2}=\frac{1}{\sqrt{1-x^2}}+c$

Answer: A

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155. The solution of $\frac{dy}{dx} - y\tan x = e^x \sec x$ is

A. $ye^x = \cos x + c$

B. $y\cos x = e^x + c$

C. $y\sin x = e^x + c$

D. $ye^x = \sin x + c$

Answer: B

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156. The solution of the differential equation $\frac{dy}{dx} - 2y\tan 2x = e^x \sec 2x$ is

A. $y\sin 2x = e^x + c$

B. $y\cos 2x = e^x + c$

C. $y = e^x \cos 2x + c$

D. $y\cos 2x + e^x = c$

Answer: B

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157. The solution of $\cos^2 x \frac{dy}{dx} + y = \tan x$ is

A. $ye^{\tan x} = (\tan x - 1)e^{\tan x} - \tan x + c$

B. $ye^{\tan x} = (\tan x + 1)e^{\tan x} + c$

C. $ye^{\tan x} = (\tan x - 1)e^{\tan x} + c$

D. $ye^{\tan x} = (\tan x - 1)e^{\tan x} + \tan x + c$

Answer: C

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158. Solve the following differential equations.

$x(x-1)\frac{dy}{dx} - (x-2)y = x^3(2x-1)$

A. $y(x-1)/x^2 = x^2 - x + c$

B. $y(x-1)/x^2 = x^2 - x + c$

C. $y(x+1)/x^2 = x^2 - x + c$

D. $y(x+1)/x^2 = x^2 + x + c$

Answer: A

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159. The solution of $\frac{dy}{dx} - \frac{xy}{1-x^2} = \frac{1}{1-x^2}$ is

A. $y\sqrt{1-x^2} = \sin^{-1} x - x + c$

B. $y\sqrt{1-x^2} = \tan^{-1} x + c$

C. $y\sqrt{1+x^2} = \sin^{-1} x - x + c$

D. $y\sqrt{1-x^2} = \sin^{-1} x + c$

Answer: D

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160. The solution of $\frac{dy}{dx} + \frac{3x^2y}{1+x^3} = \frac{1+x^2}{1+x^3}$ is

A. $y(1+x^2) = x + x^3/3 + c$

B. $y(1-x^3) = x + x^3/3 + c$

C. $y(1+x^3) = x - x^3/3 + c$

D. $y(1-x^3) = x + x^3/3 + c$

Answer: A

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161. The solution of $\frac{dy}{dx} + \frac{xy}{1+x^2} = \frac{1}{x(1+x^2)}$ is

A. $y\sqrt{1-x^2} = \sec^{-1}x + c$

B. $y\sqrt{1+x^2} = \sec^{-1}x + c$

C. $y\sqrt{1+x^2} = \sin^{-1}x + c$

D. $y\sqrt{1-x^2} = \tan^{-1} x + c$

Answer: B

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162. The solution of $x^2 \frac{dy}{dx} + (x-2)y = x^2 e^{-2/x}$ is

A. $xye^{2/x} = x^2 + c$

B. $xye^{2/x} = x^2/2 + c$

C. $xy^2 e^{2/x} = x^2/2 + c$

D. $2xye^{2/x} = x^2/2 + c$

Answer: B

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163. The solution of $x\frac{dy}{dx} - y = 2x^2 \cos ec 2x$ is

A. $\frac{y}{x} = -\log(\cos ec2x + \cot 2x) + c$

B. $\frac{y}{x} = \log(\cos ec2x + \cot 2x) + c$

C. $\frac{y}{x} = \log(\cos ec2x - \cot 2x) + x + c$

D. $\frac{y}{x} = 2\log(\cos ec2x - \cot 2x) + c$

Answer: A

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164. The solution of $\frac{dy}{dx} + y = e^x$ is

A. $2y = e^{2x} + c$

B. $2ye^x = e^x + c$

C. $2ye^x = e^{2x} + c$

D. $2ye^{2x} = 2e^x + c$

Answer: C

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165. The solution of $\cos x \frac{dy}{dx} + y = \sin x$ is

A. $y(\sec x + \tan x) = \sec x + \tan x + x + c$

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

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

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

Answer: B

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166. The solution of $\frac{dy}{dx} + y\cos x = \sin x \cos x$ is

A. $ye^{\sin x} = (\sin x - 1)e^{\sin x} - x + c$

B. $ye^{\sin x} = (\sin x + 1)e^{\sin x} + c$

C. $ye^{\sin x} = (\sin x - 1)e^{\sin x} + c$

D. $ye^{\sin x} = (\sin x - 1)e^{\sin x} - x + c$

Answer: C

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167. The solution of $x\frac{dy}{dx} + 2y = x^2 \log x$ is

A. $yx^2 = \frac{x^4}{4}\log x - \frac{x^4}{16} + c$

B. $yx^2 = \frac{x^4}{4}\log x - \frac{x^4}{6} + c$

C. $xy^2 = \frac{x^4}{4}\log x - \frac{x^4}{26} + c$

D. $yx^2 = \frac{x^4}{4}\log x - \frac{x^4}{6} + c$

Answer: A

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168. The solution of $x \log x \frac{dy}{dx} + y = 2\log x$ is

A. $y \log x = (\log x)^2 - x + c$

B. $y \log x = (\log x)^2 + c$

C. $y \log x = (\log y)^2 + c$

D. $x \log y = (\log x)^2 + c$

Answer: B

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169. Let y(x) be the solution of the differential equation . $(x \log x)\frac{dy}{dx} + y = 2x \log x, (x \geq 1)$. Then y (e) is equal to

A. e

B. 0

C. 2

D. 2e

Answer: C

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170. The solution of $ydx - xdy + \log xdx = 0$ is

A. $y - \log x - 1 = cx$

B. $x + \log y + 1 = cx$

C. $y + \log x + 1 = cx$

D. $y + \log x - 1 = cx$

Answer: C

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171. The solution of `dy/dx(x + y + 1)' = 1

A. $x + y + 2 = ce^y$

B. $x + y - 2 = ce^y$

C. $x + y - 2 = ce^y$

D. $x + y + 2 = ce^{2y}$

Answer: A

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172. The differential equation $\frac{dy}{dx} = \frac{1}{ax + by + c}$ where a,b,c are all non zero real numbers, is

A. Linear in y

B. Linear in x

C. Linear in both x & y

D. Homogeneous equation

Answer: B

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173. The solution of $y^2dx + (3xy - 1)dy = 0$ is

A. $xy^3 = y^2 + c$

B. $xy^3 = y^2/2 + c$

C. $xy^3 = y^2/3 + c$

D. $xy^3 = x^3/2 + c$

Answer: B

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174. The solution of $dx + xdy = e^{-y}\sec^2 ydy$ is

A. $xe^y = \sin y + c$

B. $x^2y^y = \tan y + c$

C. $xe^y = \tan y - x + c$

D. $xe^y = \tan y + c$

Answer: D

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175. The solution of $\frac{dy}{dx} + \frac{3}{x}y = \frac{1}{x^2}$, at y=2, x=1

A. $2x^3y = x^2 - 3$

B. $2x^3y = x^2 + 3$

C. $x^3y = x^2 + 3$

D. $2x^3y = x^2 + 5$

Answer: B

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176. The solution of $\frac{dy}{dx} + y\cot x = 4x\,\mathrm{cosec}\,x$, given that y = 0, $x = \frac{\pi}{2}$ is

A. $y \sin x = 2x^2 - \frac{\pi^2}{3}$

B. $y \sin x = x^2 - \frac{\pi^2}{2}$

C. $y \sin x = 2x^2 - \frac{\pi^2}{2}$

D. $y \sin x = 2x^2 + \frac{\pi^2}{2}$

Answer: C

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177. The solution of $\frac{dy}{dx} + 2y \tan x = \sin x$, given that $y = 0, x = \frac{\pi}{3}$ is

A. $y = \cos x - 2\cos^2 x$

B. $y = \cos x + 2\cos^2 x$

C. $y = \cos x - \cos^2 x$

D. $y = 2\cos x - 2\cos^2 x$

Answer: A

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178. The solution of $\left(x+2y^3\right)\frac{dy}{dx}=y$ is

A. $\frac{x}{y}=y+c$

B. $\frac{x}{y}=y^2+c$

C. $\frac{x}{y}=y^3+c$

D. $\frac{x}{y}=y^2+c$

Answer: B

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179. Integrating factor of $\left(x+2y^3\right)\frac{dy}{dx}=y^2$ is

A. $e^{(1/y)}$

B. $e^{-(1/y)}$

C. y

D. $-1/y$

Answer: A

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180. The solution of the differential equation $y' = \frac{1}{e^{-y} - x}$, is

A. $x = e^{-y}(y + c)$

B. $y + e^{-y} = x + c$

C. $x = e^{y}(y + c)$

D. $x + y = e^{-y} + c$

Answer: A

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181. The solution of $\frac{dx}{dy} + \frac{x}{y} = x^2$ is

A. $\frac{1}{y} = cx - x\log x$

B. $\frac{1}{x} = cy - y\log y$

C. $\frac{1}{x} = cx + x\log y$

D. $\frac{1}{y} = cx - y\log x$

Answer: B

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182. The solution of $\left(1+y^2\right)dx = \left(\tan^{-1}y - x\right)dy$ is

A. $xe^{\tan^{-1}y} = \left(\tan^{-1}y - 1\right)e^{\tan^{-1}y} + c$

B. $xe^{\tan^{-1}y} = \left(\tan^{-1}y - 1\right)e^{\tan^{-1}y} - x + c$

C. $x = \left(\tan^{-1}y - 1\right)e^{\tan^{-1}y} - y + c$

D. $x = \left(\tan^{-1}y + 1\right)e^{\tan^{-1}y} - x + y + c$

Answer: A

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183. The solution of $\frac{dy}{dx} + \frac{2x}{1+x^2}y = \frac{1}{(1+x^2)^2}$, is

A. $y(1+x^2) = \tan^{-1} x - \pi/4$

B. $y(1-x^2) = \tan^{-1} x - \pi/4$

C. $y(1+x^3) = \tan^{-1} x + \pi/4$

D. $x(1+x^2) = \tan^{1} x - \pi/4$

Answer: A

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184. The solution of $x\frac{dy}{dx} + y\log y = xye^x$ is

A. $x\log y = (x+1)e^x + c$

B. $\log y = (x-1)e^x + c$

C. $(x-1)\log y = xe^x + c$

D. $x \log y = (x-1)e^x + c$

Answer: D

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185. The solution of $\frac{dy}{dx} = e^{x-y}(e^x - e^y)$ is

A. $e^y = e^x - 1 + ce^{-e^x}$

B. $e^y = e^x + 1 + ce^{-e^x}$

C. $e^y = e^x - 1 - ce^{-e^x}$

D. $e^y = e^x - 2 + ce^{-e^x}$

Answer: A

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186. The solution of $\frac{dy}{dx} + x \sin 2y = x^3 \cos^2 y$ is

A. $\tan y = \frac{x^2}{2} + \frac{1}{2} + ce^{-x^2}$

B. $\tan y = \frac{x^2}{2} - \frac{1}{2} + ce^{x^2}$

C. $\tan y = \frac{x^2}{2} - \frac{1}{2} + ce^{-x^2}$

D. $\tan y = \frac{x^3}{2} - \frac{1}{3} + ce^{-x^2}$

Answer: C

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187. The solution of $\cos y + (x \sin y - 1)\frac{dy}{dx} = 0$ is

A. $\tan y - \sec y = cx$

B. $\tan y + \sec y = cx$

C. $x \sec y + \tan y = c$

D. $x \sec y = \tan y + c$

Answer: D

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188. Solution of the differential equation $\cos x dy = y(\sin x - y)dx, 0 < x < \pi/2$ is

A. $\sec x = (\tan x + c)y$

B. $y \sec x = \tan x + c$

C. $y \tan x = \sec x + c$

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

Answer: A

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189. The solution of $y'' + y' = 1$ is

A. $y = x - ac^{-x} + b$

B. $y = x + ac^{x} + b$

C. $y + x = ac^{-x} + b$

D. $y + x = ac^x + b$

Answer: A

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190. The solution of $y'' = y' \tan x = \sin x$ is

A. $y = \frac{1}{2}(\sin x) + a \log(\sec x + \tan x) + b$

B. $y = -\frac{1}{2}\sin x + a \log(\sec x = \tan x) + b$

C. $y = \sin x + a \log(\sec x + \tan x) + b$

D. $y = -\sin x + a \log(\sec x + \tan x) + b$

Answer: B

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191. The solution of $x\frac{dy}{dx} + y = y^2 \log x$ is

A. $\frac{1}{xy} = \frac{-(\log x)^2}{4} + c$

B. $\frac{1}{xy} = \frac{(\log x)^2}{2} + c$

C. $\frac{1}{xy} = \frac{-(\log x)^2}{2} + c$

D. $\frac{1}{xy} = \frac{-(\log x)^2}{3} + c$

Answer: C

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192. $x^2y - x^3\frac{dy}{dx} = y^4 \cos x \Rightarrow x^3y^{-3} =$

A. sin x

B. $2\sin x + c$

C. $3\sin x + c$

D. $3\cos x + c$

Answer: C

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193. The solution of the differential equation $(1+y^2)+\left(x-e^{\tan^{-1}y}\right)\frac{dy}{dx}=0$ is

A. $2xe^{\tan^{-1}y}=e^{2\tan^{-1}y}+k$

B. $xe^{\tan^{-1}y}=e^{\tan^{-1}y}+k$

C. $xe^{2\tan^{-1}y}=e^{-\tan^{-1}y}+k$

D. $(x-2)ke^{-\tan^{-1}y}$

Answer: A

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194. The solution of $\frac{dy}{dx}=1-x(y-x)-x^3(y-x)^3$ is

A. $(y-x)^2\left(x^2+1+cx^2\right)=1$

B. $(y-x)^2\left(x^2+1+ce^{x^2}\right)=1$

C. $(y-x)^2\left(x^2-1+cx^2\right)=1$

D. $(y-x)^2\left(-x^2-1+ce^{x^2}\right)=1$

Answer: D

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195. The solution of $\frac{1}{y^2}\frac{dy}{dx}+\frac{1}{xy}=1$ is

A. $\frac{1}{xy}=c+\log x$

B. $\frac{1}{xy}=c\log x$

C. $\frac{1}{xy}=c-\log x$

D. $\frac{x}{y}=c-\log x$

Answer: C

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196. The solution of $2y\frac{\cos y^2(dy)}{dx} - \frac{2}{x+1}\sin y^2 = (x+1)^3$ is

A. $\sin y^2 = (x+1)^2\left[(x+1)^2 + c\right]$

B. $\sin y^2 = (x+1)^2\left[(x+1)^2/2 + c\right]$

C. $\sin y^2 = (x+1)^2\left[(x+1)^3/3 + c\right]$

D. $\sin y^2 = (x+1)^2\left[(x+1)^4/4 + c\right]$

Answer: B

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197. The solution of $\frac{dy}{dx} + \frac{1}{x} = \frac{e^y}{x^2}$ is

A. $2x = \left(1 + cx^2\right)e^y$

B. $x = \left(1 + cx^2\right)e^y$

C. $2x^2 = \left(1 + cx^2\right)e^{-y}$

D. $x^2 = \left(1 + cx^2\right)e^{-y}$

Answer: A

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198. If a curve y = f (x) passes through the point (1 , -1) and satisfies the differential equation , $y(1+xy)dx = xdy$, then $f\left(-\frac{1}{2}\right)$ is equal to

A. $-\frac{2}{5}$

B. $-\frac{4}{5}$

C. $\frac{2}{5}$

D. $\frac{4}{5}$

Answer: D

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Exercise 2

1. I: The differential equation for the family of curves $x^2 + y^2 - 2ay = 0$, where a is an arbitraryconstantis $(x^2 - y^2)y' = 2xy$

II : The differential equation of the family of parabolas having vertices at the origin and foction y-axis is $\frac{dy}{dx} = \frac{2y}{x}$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: C

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2. I: The solution of $x^2 + y^2\frac{dy}{dx} = 4$ is $x^3 + y^3 = 12x + c$

II: The solution of $2xy\frac{dy}{dx} = 1 + y^2$ is $x^2 + y^2 = cx$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: A

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3. I: The solution of $\frac{dy}{dx} = \frac{y^2 - 2xy}{x^2 - 2xy}$ is $xy(y - x) = c$

II: The solution of $xdy = \left[y + x\cos^2\left(\frac{y}{x}\right)\right]dx$ is $\tan.\frac{y}{x} = \log(cx)$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: C

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4. Which of the following statement is correct ?

Statement I if $dy + 2xydx = 2e^{-x^2}dx$, Then $ye^{x^2} = 2x + c$

Statement II If $ye^{x^2} - 2x = c$, Then $dx = \left(2e^{-x^2} - 2xy\right)dy$

A. both I and II are true

B. neither I nor II true

C. I is true, II is false

D. I is false, II is true

Answer: C

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5. If a, b, c are the orders of the differential equations

$$\frac{d^2y}{dx^2} - \frac{5dy}{dx} + 6y = 0, \left(\frac{dy}{dx}\right)^3 + \left(\frac{dy}{dx}\right)^2 + y^4 = 0, \frac{d^3y}{dx^3} + 2\left(\frac{dy}{dx}\right)^4 + \frac{d}{d}$$

then the ascending order of a, b, c is

A. a, b ,c

B. b, c,a

C. c, a,b

D. b, a, c

Answer: D

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6. If a, b, c are the degrees of the differential equation

$$\frac{d^2y}{dx^2} - \frac{5dy}{dx} + 6y = 0, \left(\frac{dy}{dx}\right)^3 + \left(\frac{dy}{dx}\right)^2 + y^4 = 0, \left(\frac{d^3y}{dx^3}\right)^2 + 2\left(\frac{dy}{dx}\right)^4$$

then the ascending order of a, b, c is

A. a, b ,c

B. b, c,a

C. a, c, b

D. b, a, c

Answer: C

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7. If the solution of $\frac{dy}{dx} = \frac{x-y}{x+y}$ is $ax^2 + bxy + cy^2 = k, k > 0$ then the ascending order of a, b, c is

A. a, b ,c

B. b, c,a

C. c, a,b

D. b, a, c

Answer: B

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8. Match the following

Given relation, arbitrary constant	Differential equation
I. $y = a(x - a)^2$, a	a) $\frac{dy}{dx} + 2y = 0$
II. $y^2 = 4ax$, a	b) $\frac{dy}{dx} = \frac{y}{2x}$
III. $y = c\,e^{-2x}$, c	c) $\left(\frac{dy}{dx}\right)^3 - 4xy\frac{dy}{dx} + 8y^2 = 0$

A. a,b,c

B. b, c,a

C. c, a,b

D. c, b, a

Answer: D

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9. Match the following

Differential equation	Solution
I. $\sqrt{1+x^2}\,dx + \sqrt{1+y^2}\,dy = 0$	a) $\sqrt{1+x^2} + \sqrt{1-y^2} = c$
II. $x\sqrt{1+y^2}\,dx + y\sqrt{1+x^2}\,dy = 0$	b) $\sqrt{1-x^2} + \sqrt{1-y^2} = c$
III. $x\sqrt{1-y^2}\,dx + y\sqrt{1-x^2}\,dy = 0$	c) $x\sqrt{1+x^2} + y\sqrt{1+y^2} + Sinh^{-1}x + Sinh^{-1}y = c$

A. a,b,c

B. b, c,a

C. c, a,b

D. c, b, a

Answer: C

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10. Match the following

Differential equation	**Solution**
I. $(xy^2 + x)\,dx + (yx^2 + y)\,dy = 0$	a) $x^2 - 1 = c\,(1 + y^2)$
II. $(x^2 y^2 + y^2)\,dx + (x^2 - x^2y^2)\,dy = 0$	b) $(x^2 + 1)(y^2 + 1) = c$
III. $(x + xy^2)\,dx + (y - x^2y)\,dy = 0$	c) $x + \frac{1}{x} + y + \frac{1}{y} + c = 0$

A. a,b,c

B. b, c,a

C. c, a,b

D. c, b, a

Answer: B

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11. Match the following

Differential equation	Solution
I. $\frac{dy}{dx} - \frac{xy}{1-x^2} = \frac{1}{1-x^2}$	a) $y(1+x^3) = x + \frac{x^3}{3} + c$
II. $\frac{dy}{dx} + \frac{xy}{1+x^2} = \frac{1}{x(1+x^2)}$	b) $y\sqrt{1-x^2} = Sin^{-1}x + c$
III. $\frac{dy}{dx} + \frac{3x^2y}{1+x^3} = \frac{1+x^2}{1+x^3}$	c) $y\sqrt{1+x^2} = Sec^{-1}x + c$

A. a,b,c

B. b, c,a

C. c, a,b

D. c, b, a

Answer: B

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12. Match the differential equation in List I to their integrating factors in List II

List I - Differential equation	List II - Integrating factor
i) $(x^3+1)\frac{dy}{dx}+x^2y=3x^2$	a) x^3
ii) $x^2\frac{dy}{dx}+3xy=x^6$	b) $(x^3+1)^2$
iii) $(x^3+1)^2\frac{dy}{dx}+6x^2(x^3+1)y=x^2$	c) $(x^2+1)^2$
iv) $(x^2+1)\frac{dy}{dx}+4xy=\ln x$	d) x^2+1
	e) $(x^3+1)^{1/3}$
	f) $(x^3+1)^{1/2}$

The correct match is

	(i)	(ii)	(iii)	(iv)
A.	d	a	b	c
B.	e	a	b	c
C.	e	b	c	f
D.	e	a	c	d

Answer: B

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13. A: The number of arbitrary constants in the general solution of the differential equation $x^2 d^2y/dx^2 + 2x dy/dx + y = 0$ is 2

R: The number of arbitrary constants in the general solution of a differential equation is equal to the order of the differential equation.

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A

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14. Observe the following statements: A: Integrating factor of $\frac{dy}{dx} + y = x^2$ is e^x

R: Integrating factor of $\frac{dy}{dx} + P(x)y = Q(x)$ is $e^{\int p(x)\,dx}$

Then the true statement among the following is

A. A is true, R is false

B. A is false, R is true

C. A is true, R is true, $R \Rightarrow A$

D. A is false , R is false

Answer: C

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15. Observe the following statements:

A: Integrating factor of $\left(x + 2y^3\right)\frac{dy}{dx} = y$ is $\frac{1}{y}$

R: Integrating factor of $\frac{dx}{dy} + P(y)x = Q(y)$ is $e^{\int p(y)\,dy}$

Then the true statement among the following is

A. A is true, R is false

B. A is false, R is true

C. A is true, R is true, $R \Rightarrow A$

D. A is false , R is false

Answer: C

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