MATHS

BOOKS - MARVEL MATHS (HINGLISH)

DIFFERENTIAL EQUATIONS

MULTIPLE CHOICE QUESTIONS (PART - A : Building-Up The BASE)

1. $\left(\frac{d^2y}{dx^2}\right)^3 + \left(\frac{dy}{dx}\right)^4 = x^5$. Find order and degree.

A. 2, 1

B. 2, 3

C. 2, 4

D. 2, 5

Answer: B

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2. $\frac{d^3y}{dx^3} + \left(\frac{dy}{dx}\right)^3 + y = \sin x$. Find order and degree of differential equation.

A. 1, 3

B. 3, 3

C. 3, 0

D. 3, 1

Answer: D

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3. $\frac{d^3y}{dx^3} + 6\frac{d^2y}{dx^2} + y = 0$. Find order and degree of differential equation.

A. 3, 2

B. 2, 3

C. 3, 1

D. 3, 4

Answer: C

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4. $x\left(\frac{d^3y}{dx^3}\right)^2 - \left(\frac{d^2y}{dx^2}\right)^4 = 0$. Find order and degree of differential equation.

A. 3, 2

B. 3, 3

C. 3, 4

D. 2, 4

Answer: A

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5. $\left(\frac{d^2s}{dt^2}\right)^3 + 3\left(\frac{ds}{dt}\right)^5 + 5 = 0$ .Find order and degree of differential equation.

A. 2, 3

B. 3, 2

C. 2, 5

D. 3, 5

Answer: A

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6. $x + \frac{dy}{dx} = \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$. Find the order and degree.

A. 1, 2

B. 2, 1

C. 1, 1

D. 2, 2

Answer: C

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7. $\frac{d^2y}{dx^2} + \frac{1}{\left(\frac{dy}{dx}\right)^2} = y$. Find order and degree of differential equation.

A. 2, 2

B. 2, 1

C. 1, 2

D. 2, 4

Answer: B

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8. Determine the order and degree of each of the following differential equation. State also whether they are linear or non-linear: $2\frac{d^2y}{dx^2} + 3\sqrt{1 - \left(\frac{dy}{dx}\right)^2} - y = 0$

A. 2, 3

B. 3, 2

C. 2, 4

D. 2, 2

Answer: D

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9. $\left[y - x\frac{dy}{dx}\right] + \left(\frac{dy}{dx}\right)^2 = \frac{dy}{dx}$. Find order and degree of differential equation.

A. 1, 3

B. 1, 2

C. 2, 1

D. 3, 1

Answer: A

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10. find the order and degree of D.E :

(1) $\left(\frac{d^2y}{\left(dx^2\right)^2}\right) + \left(\frac{dy}{dx}\right)^3 = e^x$

(2) $\sqrt{1+\frac{1}{\left(\frac{dy}{dx}\right)^2}}=\left(\frac{d^2y}{dx^2}\right)^{\frac{3}{2}}$

(3) $e^{\frac{dy}{dx}}+\frac{dy}{dx}=x$

A. 2, 4

B. 3, 4

C. 4, 3

D. 2, 3

Answer: D

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11. $\left[\frac{d^3y}{dx^3}+x\right]^{\frac{5}{2}}=\frac{d^2y}{dx^2}$

A. 2, 7

B. 3, 7

C. 5, 7

D. 3, 5

Answer: D

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12. The degree and order of the differential equation $\left[1+\left(\frac{dy}{dx}\right)^3\right]^{\frac{7}{3}}=7\left(\frac{d^2y}{dx^2}\right)$ respectively are

A. 7, 2

B. 2, 3

C. 2, 7

D. 2, 21

Answer: B

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13. $\frac{d^3y}{dx^3} + x\left(\frac{d^2y}{dx^2}\right)^3 + y\left(\frac{dy}{dx}\right)^4 = 0$. Find order and degree of differential equation.

A. 3, 4

B. 4, 3

C. 3, 1

D. 1, 3

Answer: C

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14. The order and degree of D.E.

$$\frac{d^2y}{dx^2} = \sqrt[3]{1 + \left(\frac{dy}{dx}\right)^2}$$ are

A. 2, 3

B. 2, 4

C. 1, 4

D. 4, 1

Answer: A

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15. $\begin{vmatrix} 1 & y \\ 1 & x\frac{dy}{dx}+\sqrt{1+\left(\frac{dy}{dx}\right)^2} \end{vmatrix} - y = 0$. Find order and degree of differential equation.

A. 2, 1

B. 1, 2

C. 1, 1

D. 1, 4

Answer: B

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16. $\frac{d^4y}{dx^4} = \left[1+\left(\frac{dy}{dx}\right)^2\right]^{3/2}$. Find order and degree of differential equation.

A. 4, 6

B. 4, 3

C. 2, 4

D. 4, 2

Answer: D

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17. $y = \frac{dy}{dx} + \sqrt{1 + \frac{dy}{dx}}$. Find order and degree of differential equation.

A. 1, $\frac{1}{2}$

B. 2, 1

C. 1, 2

D. 1, 1

Answer: C

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18. $\left(y+\frac{dy}{dx}\right)^2+x\frac{dy}{dx}=x^2$. Find order and degree of differential equation.

A. 1, 2

B. 2, 1

C. 1, 1

D. 2, 2

Answer: A

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19. $\frac{d^2y}{dx^2} = \left[1 + \frac{dy}{dx}\right]^{3/2}$. Find order and degree of differential equation.

A. 2, 1

B. 2, 3

C. 2, 2

D. 3, 2

Answer: C

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20. $\sqrt[3]{\frac{dy}{dx}} = \tan x$. Find order and degree of differential equation.

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

B. 1, 3

C. 1, 1

D. 3, 1

Answer: C

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21. $\sqrt[3]{\frac{dy}{dx}\sqrt{\frac{d^3y}{dx^3}}} = 5$. Find order and degree of differential equation.

A. 3, 3

B. 3, 1

C. 3, 6

D. 3, 2

Answer: B

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22. $\begin{vmatrix} x & y \\ 1 & x\frac{dy}{dx} + \frac{dy}{dx} \end{vmatrix} = 0$. Find order and degree of differential equation.

A. 1, 1

B. 1, 0

C. $1, -1$

D. $1, \frac{1}{2}$

Answer: A

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23. $c + 4yx = 0$ is a solution of the D.E.

A. $xy + y_1 = 0$

B. $xy_1 + y = 0$

C. $y_1 = 4xy$

D. $xy_1 + 1 = 0$

Answer: B

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24. Form differential equation for $y = ax^x$

A. $y = y_1 e^x$

B. $y_1 = ye^x$

C. $yy_1 = e^x$

D. $y_1 = y(1 + \log x)$

Answer: D

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25. Derivative of$y = be^{-x}$

A. $y_1 = y$

B. $y_1 + ye^x = 0$

C. $y_1 + y = 0$

D. $y_1 + x = 0$

Answer: C

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26. The differential equation obtained by eliminating a and b from $y = ae^{bx}$ is

A. $y_2 = y_1 + y$

B. $y_2^2 = yy_1$

C. $y_1^2 = yy_2$

D. $y^2 = y_1 y_2$

Answer: C

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27. Derivative of $y = ae^{bx+c}$

A. $y_1^2 = yy_2$

B. $y_3 = yy_1^2$

C. $y_3 = y^2y_1$

D. $y^3 = y_1y_2y_3$

Answer: A

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28. Derivative of $y = ae^x + b$

A. $y_1 = y$

B. $y_2 = y_1$

C. $y = y_1 y_2$

D. $y_2 + y_1 = 0$

Answer: B

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29. Derivative of $y = ae^{-x} + b$

A. $y_2 = y_1$

B. $y + y_1 + y_2 = 0$

C. $y_2 = yy_1$

D. $y_1 + y_2 = 0$

Answer: D

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30. Find the differential equartion of the family of curves $y = Ae^x + Be^{-x}$, where A and B are arbitrary constants.

A. $y_2 = -y$

B. $y_1 = y$

C. $y_2 = y$

D. $y_2 = y_1$

Answer: C

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31. Derivative of $y = ae^{5x+1} + be^{-5x+1}$

A. $y_2 = 25y$

B. $y_2 = yy_1$

C. $y_2 = 5yy_1$

D. $y = 5y_1$

Answer: A

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32. Find the differential equation of $xy = ae^x + be^{-x}$.

A. $xy_1 + 2y_2 = xy$

B. $xy_2 + 2y_1 = xy$

C. $xy_2 = y$

D. $xy_1 + y = xy$

Answer: B

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33. The differential equation obtained by eliminating the constants a and b from $xy = ae^x + be^{-x} + x^2$ is

A. $xy_2 + 2y_1 + x^2 - xy - 2 = 0$

B. $xy_2 + 2y_1 = x^2 - xy + 2$

C. $xy_1 + 2y_2 + x^2 - xy + 2 = 0$

D. $y_2 = 2xy$

Answer: A

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34. The differential equation satisfying all the curves $y = ae^{2x} + be^{-3x}$, where a and b are arbitrary constants, is

A. $y_2 = y_1 - 6y = 0$

B. $y_2 - y_1 + 6y = 0$

C. $y_2 + y_1 - 6y = 0$

D. $y_1 - y_2 + 6y = 0$

Answer: C

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35. Derivative of $y = e^x(c_1 + c_2x)$

A. $(y_1)^2 - 2y_1 + 1 = 0$

B. $y_2 - 2y_1 + y = 0$

C. $y_2 + 2y_1 - y = 0$

D. $y_2 = 2y_1 + y$

Answer: B

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36. The differential equation of the curve $y = e^x(a\cos x + b\sin x)$ representing the given family of curves where a and b are costants , is

A. $y(2) - 2y_1 + y = 0$

B. $y_2 - 2y_1 + 2y = 0$

C. $y - 2y_1 + 2y_{2=0}$

D. $y_2 + y = 2y_1$

Answer: B

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37. Form the differential equation from the following primitives where constants are arbitrary: $y^2 = 4ax$

A. $yy_1 = 2x$

B. $y_1 = 2xy$

C. $y = 2xy_1$

D. $xyy_1 = 2$

Answer: C

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38. Form differential equation for $x^2 = 4by$

A. $y = 2xy_1$

B. $xy_1 = 2y$

C. $xy = 2y_1$

D. $yy_1 = 2x$

Answer: B

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39. Form differential equation for $(y-a)^2 = 4(x-b)$

A. $2y_2 + y_3 = 0$

B. $2y_2 = y_3$

C. $2y_1 + y_2^3 = 0$

D. $2y_2 + (y_1)^3 = 0$

Answer: D

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40. Form differential equation for $(x-a)^2 = 4(y-b)$

A. $y_2 = 2$

B. $2y_2 = 1$

C. $2y_2 = y_1$

D. $y_2 = 2y_1$

Answer: B

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41. Form differential equation for $cy + \log x = 0$

A. $yy_1 = x \log x$

B. $\frac{y}{y_1} = x \log x$

C. $xy = y_1 \log x$

D. $y_1 = xy.\log x$

Answer: B

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42. The differential equation of $y = c^2 + \frac{c}{x}$ is

A. $y = x^4(y_1)^2 - xy_1$

B. $y_1 = x^4y^2 - xy$

C. $x = y(y_1)^2 - xy$

D. $y = y_1^2 + \frac{y_1}{x}$

Answer: A

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43. Form differential equation for $y = mx + c$

A. $y_1 = xy_2$

B. $y_2 = xy_1$

C. $y_2 = 0$

D. $y_3 = y_2 + y_1$

Answer: C

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44. Form differential equation for $\frac{x}{a} + \frac{y}{b} = 1$

A. $y_3 = 0$

B. $\frac{x}{y_1} + \frac{y}{y_2} = 1$

C. $y_1 y_2 = 1$

D. $y_2 = 0$

Answer: D

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45. Form differential equation for $Ax + By + C = 0$

A. $y_3 = 0$

B. $y_2 = 0$

C. $y_3 x + y_2 y + y_1 = 0$

D. $x + y y_1 + y_2 = 0$

Answer: B

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46. Form differential equation for $y = Ax^2 + b$

A. $xy_1 = y_2$

B. $xy_1y_2 = 1$

C. $y_1y_2 = x$

D. $y_1 = xy_2$

Answer: D

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47. What is the differential equation of the curve $y = ax^2 + bx$?

A. $x^2y_2 - 2xy_1 + 2y = 0$

B. $x^2y_1 - 2xy_2 + 2y = 0$

C. $2xy_2 - x^2y_1 + 2y = 0$

D. $2xy_2 - x^2y_1 + y = 0$

Answer: A

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48. Form differential equation for $y = x + 2ax^2$

A. $2x = y(1 + y_1)$

B. $2y = x(1 + y_1)$

C. $2xy = 1 + y_1$

D. $2y_1 = x(1 + y)$

Answer: B

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49. Form differential equation for $y = A \log x + B$

A. $xy_2 + y_1 = 0$

B. $xy_1 = \ + y_2 = 0$

C. $y_1 + y_2 = x$

D. $y_2 = x + y_1$

Answer: A

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50. Form differential equation for $(y-c)^2 = cx$ A) $y = 2xy_1 + 4x(y_1)^2$ B)$y_1 = 2xy + 4xy^2$ C)$2yy_1 = 2x + 4x^2$ D)$y_1 = x^2y + x^4y^2$

A. $y = 2xy_1 + 4x(y_1)^2$

B. $y_1 = 2xy + 4xy^2$

C. $2yy_1 = 2x + 4x^2$

D. $y_1 = x^2y + x^4y^2$

Answer: A

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

A. $8y^3 = 27y_1$

B. $27(y_1)^3 = 8y$

C. $8(y_1)^3 = 27y$

D. $2y_1^3 = 3y$

Answer: C

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52. Form differential equation for $Ax^2 - By^2 = 0$ A) $xyy_2 + x(y_1)^2 - yy_1 = 0$ B)$y_1 = \frac{y}{x}$ C)$y_1 = \frac{x}{y}$ D)$y_1 = xy$

A. $xyy_2 + x(y_1)^2 - yy_1 = 0$

B. $y_1 = \frac{y}{x}$

C. $y_1 = \frac{x}{y}$

D. $y_1 = xy$

Answer: B

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53. Form a differential equation for the family of curves represented by $ax^2 + by^2 = 1$, where a and b are arbitrary constants.

A. $xyy_2 + x(y_1)^2 - yy_1 = 0$

B. $x : y = y_1$

C. $y : x = y_2$

D. $y_2 x y_1 + y^2$

Answer: A

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54. $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

A. $xyy_2 + x(y_1)^2 = yy_1$

B. $x = yy_1$

C. $x = yy_2$

D. $xy_1y_2 + y^2 = x$

Answer: A

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55. Form the differential equation corresponding to $y^2 = m(a^2 - b^2)$ by eliminating parameters $manda$.

A. $yy_1 = xyy_2 + x(y_1)^2$

B. $x - yy_2 = 0$

C. $2yy_1 = x$

D. $yy_1 = 2(x + 1)$

Answer: A

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56. Form differential equation for $(x - a)^2 + y^2 = a^2$ A) $(x + yy_1)^2 = y^2$ B)$(xy_1 + y)^2 = y^2$ C)$y^2 = x^2 + 2xyy_1$ D) $x^2 = y^2 + 2xyy_1$

A. $(x + yy_1)^2 = y^2$

B. $(xy_1 + y)^2 = y^2$

C. $y^2 = x^2 + 2xyy_1$

D. $x^2 = y^2 + 2xyy_1$

Answer: C

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57. Form differential equation for $x^2 + (y - a)^2 = a^2$ A) $y^2 = x^2 + 2xyy_1$ B)$x^2 = y^2 + \frac{2xy}{y_1}$ C)$(y_1)^2 = y^2 + 2xyy_1$ D)$y^2y_1 = x^2 + 2xy$

A. $y^2 = x^2 + 2xyy_1$

B. $x^2 = y^2 + \frac{2xy}{y_1}$

C. $(y_1)^2 = y^2 + 2xyy_1$

D. $y^2y_1 = x^2 + 2xy$

Answer: B

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58. Form differential equation for $y = e^x(a + bx + x^2)$ A) $y_2 - 2y_1 + y = 2e^x$ B)$y_2 + 2y_1 - y = 2e^x$ C) $y_2 - 2y_1 - y = 2e^x$ D)$y_1 - 2y_2 + y = 2e^x$

A. $y_2 - 2y_1 + y = 2e^x$

B. $y_2 + 2y_1 - y = 2e^x$

C. $y_2 - 2y_1 - y = 2e^x$

D. $y_1 - 2y_2 + y = 2e^x$

Answer: A

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59. Form the Differential equation for $y = ae^{2x-1} + be^{-2x-1} - 1$

A. $y_2 = 4y$

B. $y_2 = 4 + y$

C. $y_2 = 4(y+1)$

D. $y_2 = 4(x+1)$

Answer: C

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60. If $y = ae^{2x} + b\cos 2x + c\sin 2x,$ then

A. $y_3 = 8y$

B. $y_3 - 2y_2 + 4y_1 - 8y = 0$

C. $y_3 + 2y_2 - 4y_1 + 8y = 0$

D. $y_3 + 8y = 0$

Answer: B

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61. Form differential equation for $y = cx - 2c + c^3$ A) $y = xy_1 - 2y_1 + (y_1)^3$ B)$y = xy_1$ C)$yy_1 + x + y_1$ D) $y_3 - 2y_2 + xy_1 = y$

A. $y = xy_1 - 2y_1 + (y_1)^3$

B. $y = xy_1$

C. $yy_1 + x + y_1$

D. $y_3 - 2y_2 + xy_1 = y$

Answer: A

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62. Obtion the differential equation by elininating arbitrary constants A, B from the equation - $y = A\cos(\log x) + B\sin(\log x)$

A. $x^2y_2 - xy_1 + y = 0$

B. $x^2y_2 + xy_1 - y = 0$

C. $x^2y_2 - xy_1 - y = 0$

D. $x^2y_2 + xy_1 + y = 0$

Answer: D

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63. $y = A\sin 4x + B\cos 4x$ is a solution of the D.E.

A. $y_2 = 16y$

B. $y_2 + 16y = 0$

C. $y_2 = 16x$

D. $y_2 + 16x = 0$

Answer: B

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64. $y = \log x$ is a solution of the D.E.

A. $xy_2 = y_1$

B. $xy_1 + y_2 = 0$

C. $xy_2 + y_1 = 0$

D. $xy_1 = y_2$

Answer: C

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65. $y \sec x = \tan x + c$ is a solution of the D.E.

A. $y_1 + y \tan x = \sec x$

B. $y + y_1 \tan x = \sec x$

C. $y_1 = \sec x \tan x$

D. $y_1 + y \sec x = \tan x$

Answer: A

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66. $x^2 + y^2 = r^2$ is a solution of the D.E. $y = x\frac{dy}{dx} + r\sqrt{1 + \left(\frac{dy}{dx}\right)^2}$

A. $y = xy_1 - r\sqrt{1 + (y_1)^2}$

B. $y_1 = xy + r\sqrt{1 + y^2}$

C. $y_1 = xy + r\sqrt{1 + x^2}$

D. $y = xy_1 + r\sqrt{1 + (y_1)^2}$

Answer: D

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67. $\sin x \cos y + \frac{dy}{dx} \cos x \sin y = 0$

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

B. $\sec x \sec y = c$

C. $\sin x \cos y = c$

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

Answer: B

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68. $(e^y + 1)\cos x dx + e^y \sin x dy = 0$

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

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

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

D. $(e^x + 1)\sin y = c$

Answer: A

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69. $\sec y dx - x \log x dy = 0$

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

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

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

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

Answer: C

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70. $xe^{-y}dx + ydy = 0$ A) $2x^2 + (y-1)e^y = c$ B) $\frac{x^2}{2} + (y-1)e^y = c$ C) $\frac{y^2}{2} + (x-1)e^x = c$ D) $2y^2 + (x-1)e^x = 0$

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

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

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

D. $2y^2 + (x-1)e^x = 0$

Answer: B

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71. $a^x\left(y^2+1\right)dx = ydy$A)$a^x = \tan^{-1} y + c$ B)

$\tan^{-1} y = a^x \log_a e + c$ C)$a^x \log_a e = \log\left(y^2+1\right) + c$ D)

$\frac{a^x}{\log a} = \log\sqrt{y^2+1} + c$

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

B. $\tan^{-1} y = a^x \log_a e + c$

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

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

Answer: D

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72. $x(1+y^2)dx + y(1+x^2)dy = 0$A) $\tan^{-1}x + \tan^{-1}y = c$ B)$1+x^2 = c(1+y^2)$ C) $(1+x^2)(1+y^2) = c$ D)$(1-x^2)(1+y^2) = c$

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

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

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

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

Answer: C

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73. The particular solution of the differential equation $y(1+\log x)\frac{dx}{dy} - \log x = 0, \quad \text{when} x = e, y = e^2$ is

A. $x \log x = cy$

B. $y \log y = cx$

C. $xy = c$

D. $x \log y = cy$

Answer: A

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74. $\frac{dy}{dx} = (1+x)(1+y^2)$ A) $\frac{1}{2}\log\left[\frac{1+y}{1-y}\right] = x + \frac{x^2}{2} + c$ B) $\log(1+y^2) = x + \frac{x^2}{2} + c$ C) $\tan^{-1} y = x + \frac{x^2}{2} + c$ D) $\tan^{-1} x = y + \frac{y^2}{2} + c$

A. $\frac{1}{2}\log\left[\frac{1+y}{1-y}\right] = x + \frac{x^2}{2} + c$

B. $\log(1+y^2) = x + \frac{x^2}{2} + c$

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

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

Answer: C

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75. $\sqrt{1-y^2}dx - \sqrt{1-x^2}dy = 0$A)$\sin^{-1} x - \cos^{-1} y = c$

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

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

$x - y = c(1+xy)$

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

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

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

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

Answer: B

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76. $y\sqrt{1 - x^2}dy + x\sqrt{1 - y^2}dx = 0$

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

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

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

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

Answer: D

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77. $\sec x dy + \cos ecydx = 0$

A. $\cos x - \sin xy = c$

B. $\cos x + \sin y = c$

C. $\sin x - \cos y = c$

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

Answer: C

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78. Solve

$\sec^2 x \tan y dx + \sec^2 y \tan x dy = 0.$

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

B. $\sin(x - y) = c$

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

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

Answer: A

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79. Find the general solution of the differential equations

$e^x \tan y dx + (1 - e^x)\sec^2 y dy = 0$

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

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

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

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

Answer: C

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80. Solve : $3e^x\tan y dx+(1-e^x)\sec^2 y\,dy=0$

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

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

C. $\tan y=c\left(1-e^{3x}\right)$

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

Answer: B

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81. $(x+1)\dfrac{dy}{dx}+1=2e^{-y}$

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

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

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

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

Answer: D

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82. `y^(2)-(dy)/(dx)=x^(2)

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

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

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

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

Answer: A

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83. $y - x\frac{dy}{dx} = y^2 + \frac{dy}{dx}$

A. $(1 - x)(1 + y) = cy$

B. $(1 - x)(1 - y) = cy$

C. $(1+x)(1-y)=cy$

D. $(1+x)(1+y)=cy$

Answer: C

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84. $y-x\frac{dy}{dx}=3y^2+\frac{dy}{dx}$ A) $(1+x)(1-cy)=3y$ B) $(1+x)(1-3y)=cy$ C) $(1-x)(1-3y)=cy$ D) $(1+3x)(1-y)=cx$

A. $(1+x)(1-cy)=3y$

B. $(1+x)(1-3y)=cy$

C. $(1-x)(1-3y)=cy$

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

Answer: B

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85. Solve the following differential equations :

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

A. $(1 + 3x)(3 - y) = cy$

B. $(3x - 1)(y + 3) = cx$

C. $(1 - 3x)(3 - y) = cy$

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

Answer: D

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86. $(\tan y)\frac{dy}{dx} = \sin(x+y) - \sin(x-y)$A) $\sec y \tan y = 2\sin x + c$ B)$\log(\cos y - \cot y) = 2\sin x + c$ C)$\log(\sec y + \tan y) = 2\sin x + c$ D)$\sec y + \tan y = c.\, e^{\sin x}$

A. $\sec y \tan y = 2\sin x + c$

B. $\log(\cos y - \cot y) = 2\sin x + c$

C. $\log(\sec y + \tan y) = 2\sin x + c$

D. $\sec y + \tan y = c.\, e^{\sin x}$

Answer: C

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87. $\frac{dy}{dx}\cot y = \cos(x+y) + \cos(x-y)$ A) $\log(\sec y + \tan y) = 2\cos x + c$ B)

$\log(\cos ecy - \cot y) = 2\sin x + c$ C)

$\log(\cos y - \cot y) = 2\cos x + c$ D)$\cos y - \cot y = c.\, e^{\cos x}$

A. $\log(\sec y + \tan y) = 2\cos x + c$

B. $\log(\cos ecy - \cot y) = 2\sin x + c$

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

D. $\cos y - \cot y = c.\, e^{\cos x}$

Answer: B

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88. $e^{dy/dx} = 1$ A)$y = x + c$ B)$y = e^x + c$ C)$y = c$ D)

$y = cx + d$

A. $y = x + c$

B. $y = e^x + c$

C. $y = c$

D. $y = cx + d$

Answer: C

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89. $e^{dy/dx} = x$ A)$y = x\log\left(\frac{x}{e}\right) + c$ B)$y = x\log x + c$ C) $y = e^x + c$ D)$x = y\log(ex) + c$

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

B. $y = x\log x + c$

C. $y = e^x + c$

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

Answer: A

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90. $e^{\left(\frac{1}{2}\frac{dy}{dx}\right)} = 3^x$ A)$y = 3^x \log 3 + c$ B)$y = x^2 \log 3 + c$ C) $y = 3\log x + c$ D)$y = x^3 \log 3 + c$

A. $y = 3^x \log 3 + c$

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

C. $y = 3\log x + c$

D. $y = x^3 \log 3 + c$

Answer: B

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91. $x^2dx - y^2dy + xdx = dy - ydy - dx$ A) $2(x^3 - y^3) - 3(x^2 + y^2) + 6(x - y) = c$ B) $2(x^3 - y^3) + 3(x^2 - y^2) + 6(x + y) = c$ C) $2(x^3 - y^3) - 3(x^2 + y^2) - 6(x - y) = c$ D) $2(x^3 - y^3) + 3(x^2 + y^2) + 6(x - y) = c$

A. $2(x^3 - y^3) - 3(x^2 + y^2) + 6(x - y) = c$

B. $2(x^3 - y^3) + 3(x^2 - y^2) + 6(x + y) = c$

C. $2(x^3 - y^3) - 3(x^2 + y^2) - 6(x - y) = c$

D. $2(x^3 - y^3) + 3(x^2 + y^2) + 6(x - y) = c$

Answer: D

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92. The family of curves represented by $\frac{dy}{dx} = \frac{x^2 + x + 1}{y^2 + y + 1}$ and the family represented by $\frac{dy}{dx} + \frac{y^2 + y + 1}{x^2 + x + 1} = 0$

A. $2(x^3 - y^3) + 3(x^2 - y^2) + 6(x - y) = c$

B. $2(x^3 - y^3) + 3(x^2 + y^2) + 6(x - y) = c$

C. $2(x^3 - y^3) + 3(y^2 - x^2) + 6(y - x) = c$

D. $2(x^3 - y^3) - 3(x^2 - y^2) + 6(x - y) = c$

Answer: A

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93. $dy - e^{x-y}dx = x^2e^{-y}dx$ A) $e^x = e^y + \frac{x^3}{3} + c$ B) $e^x = e^y + \frac{y^3}{3} + c$ C) $e^y = e^x + \frac{x^3}{3} + c$ D)

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

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

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

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

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

Answer: C

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94. $\frac{dy}{dx} = \frac{xy + y}{xy + x}$

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

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

C. $y \log y = x \log x + c$

D. $\log(xy) = (x - y) + c$

Answer: B

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95. $\frac{dy}{dx} = \frac{xy}{(1-x)(1+y)}$ A) $x + y + \log[y(1-x)] = c$ B) $x + y + \log[x(1-y)] = c$ C) $x + y + \log(x+y) = c$ D) $y - x + \log[x(1-y)] = c$

A. $x + y + \log[y(1-x)] = c$

B. $x + y + \log[x(1-y)] = c$

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

D. $y - x + \log[x(1-y)] = c$

Answer: A

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96. $\frac{dy}{dx} = \frac{\sin x + x \cos x}{y(1 + 2 \log y)}$ A) $x \cos x = y^2 \log y + c$ B) $x \log y = y^2 \sin x + c$ C) $x \sin x = y^2 \log y + c$ D) $y \sin y = x^2 \log x + c$

A. $x \cos x = y^2 \log y + c$

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

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

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

Answer: C

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97. $\sqrt{1+\cos x}\frac{dy}{dx}=\sqrt{1-\cos y}$

A) $\sec\left(\frac{y}{2}\right)+\tan\left(\frac{y}{2}\right)=c\left[\cos\left(\frac{x}{2}\right)-\cot\left(\frac{x}{2}\right)\right]$

B) $\cos ec\left(\frac{y}{2}\right)-\cot\left(\frac{y}{2}\right)=c\left[\sec\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)\right]$

C) $2\sqrt{1-\cos y}=2\sqrt{1+\cos x}+c$

D) $\sqrt{1+\sin x}=c\sqrt{1-\sin y}$

A. $\sec\left(\frac{y}{2}\right)+\tan\left(\frac{y}{2}\right)=c\left[\cos\left(\frac{x}{2}\right)-\cot\left(\frac{x}{2}\right)\right]$

B. $\cos ec\left(\frac{y}{2}\right)-\cot\left(\frac{y}{2}\right)=c\left[\sec\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)\right]$

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

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

Answer: B

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98. Solve the following differential equation:

$$(1+y^2)\tan^{-1}dx + 2y(1+x^2)dy = 0$$

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

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

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

D. $(\tan^{-1}x)(\tan^{-1}y) = c$

Answer: A

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99. $x\cos^2 y dx = y\cos^2 x dy$ A) $x\sin 2y = y\cos 2x + c$ B) $x\tan x = y\tan y + c$ C) $x\tan x - y\tan y = \ln\left(\frac{\sec x}{\sec y}\right) + c$ D) $x\sec x = y\sec y + c$

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

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

C. $x \tan x - y \tan y = \ln\left(\frac{\sec x}{\sec y}\right) + c$

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

Answer: C

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100. $\left(x - y^2 x\right)dx + \left(y - x^2 y\right)dy = 0$ Solve the differential equation.

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

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

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

D. $x + y = xy$

Answer: B

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101. $\left(x + xy^2\right)dx + \left(y - x^2y\right)dy = 0$

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

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

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

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

Answer: B

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102. Solve the differential equation

$$(x^2 - x^2y)dy + (y^2 + xy^2)dx = 0$$

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

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

C. $\log\left(\frac{y}{x}\right) + \frac{1}{x} + \frac{1}{y} + c$

D. $\log\left(\frac{x}{y}\right) = \frac{1}{x} + \frac{1}{y} + c$

Answer: D

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

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

B. $x + \left(x^{-1} - y^{-1}\right) = \log(cy)$

C. $x^2 + xy + \log\left(\frac{y}{x}\right) = c$

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

Answer: A

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104. $xy^2\frac{dy}{dx} + x\frac{dy}{dx} = 1 - x^2 - x$

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

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

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

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

Answer: C

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105. $\log\left(\frac{dy}{dx}\right) = 2x + 3$ A) $y = \log(2x + 3) + c$ B) $2y = e^{2x+3} + c$ C) $\sqrt{y} = \log(2x + 3) + c$ D) $2e^y + 3 = \log y + c$

A. $y = \log(2x + 3) + c$

B. $2y = e^{2x+3} + c$

C. $\sqrt{y} = \log(2x + 3) + c$

D. $2e^y + 3 = \log y + c$

Answer: B

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

A. $x = c - \frac{1}{3e^{2+3y}}$

B. $3xe^{2+3y} = c$

C. $\log x + (2 + 3y) = c$

D. $y = ce^{2x+3}$

Answer: A

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

A. $y = e^{2x+3y}$

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

C. $y = \log(2x + 3y) + c$

D. $e^{2x} + e^{3y} = c$

Answer: B

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108. $(x - y)\left(1 - \frac{dy}{dx}\right) = e^{y}$, where $x - y = u$ A) $ue^{u} - e^{u} = e^{x} + c$ B) $u^{2} = e^{x} + c$ C) $u^{2} = \frac{1}{2}e^{x} + c$ D) $u^{2}e^{x} = 2x + c$

A. $ue^{u} - e^{u} = e^{x} + c$

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

C. $u^{2} = \frac{1}{2}e^{x} + c$

D. $u^2e^x = 2x + c$

Answer: A

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109. $x + y\frac{dy}{dx} = x^2 + y^2$, where $x^2 + y^2 = u$ A) $x^2 + y^2 = e^x + c$ B)$x^2 + y^2 = \log x + c$ C)$x^2 + y^2 = ce^{2x}$ D)$\tan^{-1}\left(\frac{x}{y}\right) = ce^{2x}$

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

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

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

D. $\tan^{-1}\left(\frac{x}{y}\right) = ce^{2x}$

Answer: C

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110. $\left(x\frac{dy}{dx}+y\right)\sin(xy)=\cos x,$ where $xy=u$

A. $\sin x-\cot(xy)=c$

B. $\cos(xy)-\sin x=c$

C. $\cos x-\sin(xy)=c$

D. $\sin x+\cos(xy)=c$

Answer: D

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111. $\left(x\frac{dy}{dx}-y\right)e^{y/x}=x^2\cos x,$ where $v=\frac{y}{x}$

A. $e^v = (\cos x) + c$

B. $e^{\sin x} = v + c$

C. $e^{\cos x} = v + c$

D. $e^v = (\sin x) + c$

Answer: D

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112. $\frac{dy}{dx} = \sin(x + y) + \cos(x + y)$, where $x + y = u$

A. $1 + \tan u = e^x + c$

B. $1 + \tan\left(\frac{u}{2}\right) = e^x + c$

C. $1 + \tan\left(\frac{u}{2}\right) = ce^x$

D. $\tan(x + y) = ce^x$

Answer: C

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113. $1 + \frac{dy}{dx} = \cos(x + y)$, where $x + y = u$

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

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

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

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

Answer: A

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114. $(x+y)(dx-dy)=dx+dy$, where $x+y=u$

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

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

C. $x-y=\log u+c$

D. $u=\log u+c$

Answer: C

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115. $(x-y+1)\dfrac{dy}{dx}=x-y+2$, where $x-y=u$

A. $u^2+2x-y=c$

B. $\dfrac{u^2}{2}+2x-y=c$

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

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

Answer: B

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116. $x\dfrac{dy}{dx} = y + \sqrt{x^2 - y^2}$, where $\dfrac{y}{x} = b$

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

B. $\log v = \sin^{-1} x + c$

C. $\log\left(\sin^{-1} v\right) = x + c$

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

Answer: D

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117. The solution of x sin $\left(\frac{y}{x}\right)dy = \left\{y\sin\left(\frac{y}{x}\right) - x\right\}dx,$ is given by

A. $\log x + \sin v = c$

B. $\log v - \cos x = c$

C. $\log x - \cos v = c$

D. $\log v + \sin x = c$

Answer: C

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118. Solve :

$$\left\{x\cos\left(\frac{y}{x}\right)+y\sin\left(\frac{y}{x}\right)\right\}ydx=\left\{y\sin\left(\frac{y}{x}\right)-x\cos\left(\frac{y}{x}\right)\right\}xdy$$

A. $xy\cos v=c$

B. $v\cos v=c$

C. $xy\sin v=c$

D. $v\sin v=c$

Answer: A

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119. $\frac{dy}{dx}=3x-2y+5,$ where $3x-2y+5=u$ A) $6x-4y+10=ce^{2x}$ B) $-6x+4y-7=c.e^{-2x}$ C) $\log u=2x+c$ D) $\log u=2u+c$

A. $6x - 4y + 10 = ce^{2x}$

B. $-6x + 4y - 7 = c.\, e^{-2x}$

C. $\log u = 2x + c$

D. $\log u = 2u + c$

Answer: B

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120. $\cos^2(x - 2y) = 1 - 2\dfrac{dy}{dx}$, where $x - 2y = u$

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

B. $x = \tan u + c$

C. $u = \tan x + c$

D. $u = \tan u + c$

Answer: B

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121. $x\frac{dy}{dx} = y(\log y - \log x)$, where $y = vx$

A. $\log x = 1 + cv$

B. $\log v = x + c$

C. $\log v = cx$

D. $\log v = 1 + cx$

Answer: D

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122. $x(\log x - \log y)dy - ydx = 0$, where $\log x - \log y = u$

A)$cx = \log\left(\frac{x}{y}\right)$ B)$\log.\ \frac{x}{y} = \log\left(\log.\ \frac{x}{y}\right) - \frac{x}{y} = x + c$ C) $e^{\frac{x}{y}} + e^{\frac{x}{y}-1} = e^x + c$ D)$u = c(\log u - 1)$

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

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

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

D. $u = c(\log u - 1)$

Answer: A

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123. $\frac{dy}{dx} = \frac{y}{x} - \frac{x}{y}$, where $y = vx$ A)$y^2 = x\log\left(\frac{c}{x}\right)$ B) $y^2 = 4x\log\left(\frac{c}{x}\right)$ C)$y^2 = 2x^2\log\left(\frac{c}{x}\right)$ D)$v^2 = 2c\log v$

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

B. $y^2 = 4x \log\left(\frac{c}{x}\right)$

C. $y^2 = 2x^2 \log\left(\frac{c}{x}\right)$

D. $v^2 = 2c \log v$

Answer: C

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124. $y(1 + \log x)\frac{dx}{dy} - x \log x = 0, y = e^2 \text{ if } x = w$

A. $y = ex \log x$

B. $ey = x \log x$

C. $x = ey \log y$

D. $ex = y \log y$

Answer: A

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125. $x dx + \sec x dy = 0, y = 0 \text{ if } x = \frac{\pi}{2}$ A) $x + y\cos y + \cos y = \frac{\pi}{2}$ B) $y + x\sin x - \cos x = \frac{\pi}{2}$ C) $y + x\sin x + \cos x = \frac{\pi}{2}$ D) $x + y\sin y + \cos y = \frac{\pi}{2}$

A. $x + y\cos y + \cos y = \frac{\pi}{2}$

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

C. $y + x\sin x + \cos x = \frac{\pi}{2}$

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

Answer: C

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126. $(x+1)\dfrac{dy}{dx} - 1 = 2e^{-y}, y = 0, \quad \text{when} \quad x = 1$

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

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

C. $xe^y + 2 = 0$

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

Answer: B

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127. $\dfrac{dy}{dx} + \dfrac{y+2}{x+2} = 0, y = 2 \quad \text{if} \quad x = 1$ A) $xy + 2(x+y) = 8$ B)$xy + 8(x+y) = 2$ C) $(x+2) + 2(y+2) = 8$ D)$8(x+2) + (y-2) = 2$

A. $xy + 2(x + y) = 8$

B. $xy + 8(x + y) = 2$

C. $(x + 2) + 2(y + 2) = 8$

D. $8(x + 2) + (y - 2) = 2$

Answer: A

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128. $(x - 1)dy - (1 + y)dx = 0, y = 4$ if $x = 2$ A) $5(x - 1)(1 + y) = 1$ B)$(x - 1)(1 + y) = 5$ C) $1 + y = 5(x - 1)$ D)$5(1 + y) = x - 1$

A. $5(x - 1)(1 + y) = 1$

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

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

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

Answer: C

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129. Solve the following differential equation: $3e^x \tan y \, dx + (2 - e^x)\sec^2 y \, dy = 0$, given that when $x = 0, \ y = \frac{\pi}{4}$.

A. $8(1 + e^x)^3 \tan y = 1$

B. $(1 + e^x)^3 \tan y = 8$

C. $(1 + e^x)^3 \tan y = 27$

D. $2(1 + e^x) = \tan^3 y$

Answer: B

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130. D.E. of lines, passing through the origin, is

A. $xy_1 = y$

B. $xy = y_1$

C. $xy + y_1 = 0$

D. None of these

Answer: A

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131. D.E. of family of lines $ax + by + c = 0$ is

A. $y = xy_1 + c$

B. $y_1 = 0$

C. $y_3 = 0$

D. None of these

Answer: C

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132. $y = ax^2 + bx + c$ is the general solution of the D.E. A) $y_1 = 0$ B)$y_2 = 0$ C)$y_3 = x$ D)$y_3 = 0$

A. $y_1 = 0$

B. $y_2 = 0$

C. $y_3 = x$

D. $y_3 = 0$

Answer: D

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133. The differenital equation of all circles whose centres are at the origin is

A. $ydx - xdy = 0$

B. $xdx + ydy = 0$

C. $ydx + xdy = 0$

D. $xdx - ydy = 0$

Answer: B

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134. D.E., having the solution $y = c_1 + c_2 e^{3x}$, is A)$y_2 = 3y$ B) $y_2 = 3y_1$ C)$y_3 + 3y_1 = 0$ D)$y_2 + 3y = 0$

A. $y_2 = 3y$

B. $y_2 = 3y_1$

C. $y_3 + 3y_1 = 0$

D. $y_2 + 3y = 0$

Answer: B

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135. D.E. of all circules of a given radius a and variable centre (h, k) is

A. $\left(1+y_1^2\right)^3+a^2(y_2)^2=0$

B. $\left(1+y_1^2\right)^2+a^2(y_2)^3=0$

C. $\left(1+y_1^2\right)^3=a^2(y_2)^2$

D. $2xdx+2ydt=a^2$

Answer: C

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136. $y=a\cos x+b\sin x+x\sin x$ is a solution of the D.E. A) $y_2+y=x\cos x$ B)$y_2+2y=2\cos x$ C)$y_2+y=2\cos x$ D) $y_2-y=2\cos x$

A. $y_2 + y = x \cos x$

B. $y_2 + 2y = 2 \cos x$

C. $y_2 + y = 2 \cos x$

D. $y_2 - y = 2 \cos x$

Answer: C

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

A. $y_2\left(a^2 - x^2\right) = x^2$

B. $(y_1)^2\left(a^2 + x^2\right) = x^2$

C. $(y_1)^2\left(a^2 - x^2\right) = x^2$

D. $(y_1)^2(y^2 - x^2) = x^2$

Answer: C

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138. The order of the differential equation whose general solution is given by $y = (C_1 + C_2)\sin(x + C_3) - C_4 e^{x + (C_5)}$, is

A. 5

B. 4

C. 3

D. 2

Answer: C

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139. If a = order and b = degree of the D.E. $y_2 = \left(1 + y_1^2\right)^{3/2}$, then $a + b = \ldots$ A)1 B)3 C)5 D)4

A. 1

B. 3

C. 5

D. 4

Answer: D

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140. If $y = e^{4x} + 2e^{-x}$ satisfis the differential equation $y_3 + Ay_1 + By = 0$ then

A. $A = 12, B = 13$

B. $A = 13, B = 12$

C. $A = -12, B = -13$

D. $A = -13, B = -12$

Answer: D

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141. If the D.E. $\frac{dy}{dx} = \frac{gx + 3}{2y + f}$ represents a circle, then g = A)2 B)-2 C)3 D)-4

A. 2

B. -2

C. 3

D. -4

Answer: B

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142. $y = ax + \frac{b}{x}$ is a solution of the D.E. A) $x^2y_2 + xy_1 + y = 0$ B)$x^2y_2 + 2xy_1 + 2y = 0$ C) $x^2y_2 + xy_1 - y = 0$ D)$x^2y_2 - xy_1 + y = 0$

A. $x^2y_2 + xy_1 + y = 0$

B. $x^2y_2 + 2xy_1 + 2y = 0$

C. $x^2y_2 + xy_1 - y = 0$

D. $x^2y_2 - xy_1 + y = 0$

Answer: C

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143. The order of the differential equation, whose general solution is $y = C_1e^x + C_2e^{2x} + C_3e^{3x} + C_4e^{x-c_5}$, where C_1, C_2, C_3, C_4, C_5 are arbitrary constants, is

A. 2

B. 3

C. 4

D. 5

Answer: B

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144. $y^2 = a(b-x)(b+x)$ is a solution of the D.E. A) $y_2 + x(y_1)^2 + yy_1 = 0$ B)$xyy_2 + x(y_1)^2 - yy_1 = 0$ C) $xyy_2 - x(y_1)^2 + yy_1 = 0$ D)$yy_1, y_2 = x^2$

A. $y_2 + x(y_1)^2 + yy_1 = 0$

B. $xyy_2 + x(y_1)^2 - yy_1 = 0$

C. $xyy_2 - x(y_1)^2 + yy_1 = 0$

D. $yy_1, y_2 = x^2$

Answer: B

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145. D.E. $yy_1 + x = a$, where a is a constant, represents a family of

A. circles centred on X-axis

B. circles centred on Y-axis

C. parabolas

D. ellipses

Answer: A

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146. If $f(x) = f'(x)$ and $f(1) = 2$, then $f(3) =$

A. e^2

B. $2e^2$

C. $3e^2$

D. $2e^3$

Answer: B

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147. If $\frac{dy}{dx} = \frac{x-y+2}{x-y+1}$, where $u = x - y$, then

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

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

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

D. None of these

Answer: D

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148. If $\frac{dy}{dx} = \frac{y - x + 2}{y - x + 1}$, then

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

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

C. $\frac{x - y}{2} - (2x - y)^2 = c$

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

Answer: A

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149. General solution of the D.E. $y_2 = e^{-2x}$ is $y =$

A. $\frac{1}{4}e^{-2x}$

B. $\frac{1}{4}e^{-2x} + cx + d$

C. $\frac{1}{4}e^{-2x} + cx^2 + d$

D. None of these

Answer: B

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150. The standard unit circle satisfies the D.E.

A. $yy_2 - 2y_1 + 1 = 0$

B. $yy_2 + (y_1)^2 + 1 = 0$

C. $yy_1 - (y_1)^2 - 1 = 0$

D. $y_2 + 2(y_1)^2 + 1 = 0$

Answer: B

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151. General solution of $\frac{dy}{dx} + \frac{x}{y} = 0$ is

A. $x^2 + y^2 + c = 0$

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

C. $x^2 + y + c = 0$

D. $x^2 - y + c = 0$

Answer: A

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152. General solution of $3x\frac{dy}{dx} - 2y = 0$ is

A. $y^3 = cx^3$

B. $y^3 = cx^2$

C. $y = cx^3$

D. None of these

Answer: B

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153. General solution of $\frac{dy}{dx} + \frac{2y+2}{x-3} = 0$ is

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

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

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

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

Answer: D

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154. General solution of $\frac{dy}{dx}+\frac{2xy}{1+x^2}=0$ is

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

B. $y(1+x)=c$

C. $1+x^2=cy$

D. None of these

Answer: A

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155. General solution of $\frac{dy}{dx} - \frac{y^2}{x^2} = 0$ is

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

B. $x - y = cxy$

C. $x + y = cxy$

D. None of these

Answer: B

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156. General solution of $\frac{dy}{dx} + \frac{3y^2}{2x} = 0$ is

A. $3\log x + \frac{2}{y} = c$

B. $2\log x + \frac{3}{y} = c$

C. $3\log x - \frac{2}{4} = c$

D. None of these

Answer: D

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157. General solution of $\frac{dy}{dx} - \frac{\sqrt{1-y^2}}{\sqrt{1-x^2}} = 0$ is

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

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

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

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

Answer: B

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

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

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

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

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

Answer: C

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159. General solution, of $\frac{dx}{dy} + \frac{1+x^2}{1+y^2} = 0$ is

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

B. $x + y = c(1 + xy)$

C. $x - y = c(1 - xy)$

D. $x + y = c(1 + xy)$

Answer: A

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

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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161. 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. None of these

Answer: C

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162. General solution of $\left(y+y^2\right)dy=\left(x+x^2\right)dx$ 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. None of these

Answer: A

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163. General solution of $\frac{dy}{dx} = e^{x-y}$ is

A. $e^x + e^y = c$

B. $e^x = ce^y$

C. $e^y - e^x = c$

D. $e^y = ce^x$

Answer: C

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

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

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

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

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

Answer: A

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

A. $x - y = c$

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

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

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

Answer: C

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

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

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

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

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

Answer: C

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167. General solution of $\frac{dy}{dx} = \cot x$ is

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

B. $e^{y} = c\cos x$

C. $e^{y} = c\sin x$

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

Answer: C

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168. General solution of $(\tan y)dy = dx$ is

A. $e^{x}\sin y = c$

B. $e^{x}\cos y = c$

C. $e^{x}\sec y = c$

D. $e^{x}\cos y = c$

Answer: B

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169. General solution of $\cot y \cos^2 x dy + \cot x \cos^2 y dx = 0$ is

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

B. $\tan x - c \tan y$

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

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

Answer: C

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170. Find the general solution of the differential equations

$e^x \tan y dx + (1 - e^x)\sec^2 y dy = 0$

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

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

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

D. $\tan x = ce^y$

Answer: A

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

D. $e^x \tan y = c$

Answer: A

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

A. $\tan y = ce^{2x}$

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

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

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

Answer: B

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173. General solution of $y - x\frac{dy}{dx} = 8\left(y^2 + \frac{dy}{dx}\right)$ is

A. $(x+8)(8y+1) = cy$

B. $(x+8)(8y-1) = cy$

C. $(8x+1)(y-1) = cy$

D. None of these

Answer: D

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174. General solution of $\left(x^2+\frac{x^2}{y^2}\right)dy+\left(x^2+1\right)dx=0$ is

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

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

C. $x+y=cxy$

D. $x-y=cxy$

Answer: B

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175. General solution of $\left(xy^2+x\right)dx+\left(yx^2+y\right)dy=0$ is

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

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

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

D. None of these

Answer: C

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176. General solution of $\frac{x}{dx}=\frac{y}{dy}$ is

A. $xy=c$

B. $x=cy$

C. $y=cx$

D. $e^x=e^y+c$

Answer: B

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177. General solution of $\left(x^3y^2+y^2\right)\frac{dy}{dx}+\left(x^2y^3+x^2\right)=0$ 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: B

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178. General solution of $\frac{dy}{dx}=4x-3xy-3y+4$ is

A. $\log(4-3y)+3x+\frac{x^2}{2}+c=0$

B. $\log(4-3y)-3x-\frac{3x^2}{2}+c=0$

C. $\log(4-3y)+3x+\frac{3x^2}{2}+c=0$

D. None of these

Answer: C

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179. General solution of $\frac{dy}{dx}=2xy+4x-3y-6$ is $\log(y+2)=$

A. x^2-3x+c

B. x^2+3x+c

C. $3x^2+x+c$

D. None of these

Answer: A

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180. General solution of $\frac{dy}{dx} + \frac{x^2(1+y^4)}{y^3(1+x^3)} = 0$ is

A. $(1+x^3)^3(1+y^4)^4 = c$

B. $(1+x^3)^4(1+y^4)^3 = c$

C. $(1+x^3)^4(1+y^4)^2 = c$

D. None of these

Answer: B

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

A. $(y-5)^2\left(1-x^2\right)=c$

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

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

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

Answer: D

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182. General solution of $y-x\frac{dy}{dx}=5\left(y^2+\frac{dy}{dx}\right)$ is $cy=$

A. $(x-5)(1-5y)$

B. $\left(x^2+5\right)(1-5y)$

C. $(x+5)(1-5y)$

D. None of these

Answer: C

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183. General solution of $(y+2)dy=\left(x^2+4x-9\right)dx$ is

A. $2y=(x+2)^2-26\log(x+2)+c$

B. $2y=(x-2)^2+26\log(x+2)+c$

C. $y=(x+2)^2+13\log(x+2)+c$

D. None of these

Answer: D

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184. Find the general solution of the differential equations

$\left(e^x + e^{-x}\right)dy - \left(e^x - e^{-x}\right)dx = 0$

A. $y = \log\left(e^x - e^{-x}\right) + c$

B. $y = \log\left(e^x + e^{-x}\right) + c$

C. $y\left(e^x + e^{-x}\right) = c$

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

Answer: B

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185. General solution of $\frac{dy}{dx} - \frac{2y+3}{5-x} = 0$ is

A. $(5+x)^2(2y+3) = c$

B. $(2y+3)^2(5-x) = c$

C. $(5-x)^2(2y+3) = c$

D. $(2x+3)^2(5-y) = c$

Answer: C

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186. General solution of $y(1+x)dx + x(1+y)dy = 0$ is

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

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

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

D. $x + y - \log(xy) = c$

Answer: C

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187. The solution of the differential equation $ydx - xdy = xydx$ is

A. $y = cye^x$

B. $x = ye^x$

C. $y = xe^x$

D. $y = cxe^x$

Answer: A

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188. General solution of $\frac{dy}{dx} + \frac{y}{3} = 1$ is

A. $y = 3 + ce^{x/3}$

B. $3y = c + e^{x/3}$

C. $y = 3 + ce^{-x/3}$

D. $3y = c + e^{-x/3}$

Answer: C

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189. If $\frac{dy}{dx} = 3x^2 + 1$ and $y = 30$ when $x = 3$, then $y =$

A. $x^3 - x + 2$

B. $x^3 + x + 2$

C. $x^3 + x - 2$

D. $x^3 + x$

Answer: D

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190. Find the particular solution of the differential equation $\left(1 + x^2\right)\sec^2 y dy + 2x \tan y dx = 0$, it is given that at $x = 1$, $y = \pi / 4$.

A. $(1+x^2)\tan y = 0$

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

C. $(1+x^2)\cot y = 0$

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

Answer: B

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191. $2e^x dx - \sec^2 y dy = 0$

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

B. $2e^x - \tan y = c$

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

D. $2e^{2x} + \tan y = c$

Answer: B

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192. $(x^2 + x)dx + (y^2 - y)dy = 0$

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

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

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

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

Answer: A

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193. $\frac{1}{x}dy - \frac{1}{y^3}dx = 0$

A. $y^2 - 4x^4 = c$

B. $y^2 + 4x^4 = c$

C. $y^4 - x^2 = c$

D. $2x^2 - y^4 = c$

Answer: D

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194. $\frac{dy}{dx} = \frac{3 + x^2}{9 + y^2}$

A. $x^3 - y^3 + 9(x - 3y) = c$

B. $x^3 + x + y^3 + 27y = c$

C. $3\tan^{-1}\left(\frac{x}{3}\right) = \tan^{-1}\left(\frac{y}{9}\right) + c$

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

Answer: A

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195. $y^3dx + x^2dy = 0$

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

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

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

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

Answer: B

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196. $y^3dx - 2x^2dy = 0$

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

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

C. $3y^2 - 4x = c$

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

Answer: A

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197. $3x^2y + \frac{dy}{dx} = 0$

A. $x^3 - \log y = c$

B. $c = ye^{x^3}$

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

D. $c = xe^{y^3}$

Answer: B

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198. $3x^2 \dfrac{dy}{dx} + 2y = 0$ Solve.

A. $2\log y - \dfrac{3}{x} = c$

B. $2\log y + \dfrac{3}{x} = c$

C. $3\log y - \dfrac{2}{x} = c$

D. None of thse

Answer: C

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199. $(3x+1)dy+(2y-3)dx=0$

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

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

C. $6(3x+2y)^5=c$

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

Answer: A

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200. $(1+x)dy-(2+2y)dx=0$

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

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

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

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

Answer: B

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201. $xydx+\sqrt{1+x^2}dy=0$

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

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

C. $4\sqrt{1+x^2}+y^2=c$

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

Answer: D

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202. $\frac{dy}{dx}=\frac{4+y^2}{1+x^2}$

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

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

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

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

Answer: B

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203. $\sqrt{1-x^2}dy + ydx = 0$

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

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

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

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

Answer: B

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204. $\frac{dy}{dx} + \sqrt{\frac{b^2 - y^2}{a^2 - x^2}} = 0$

A. $ax + by = c(1 - abxy)$

B. $\sin^{-1}\left(\frac{x}{a}\right) + \cos^{-1}\left(\frac{y}{b}\right) = c$

C. $\cos^{-1}\left(\frac{x}{a}\right) + \sin^{-1}\left(\frac{y}{b}\right) = c$

D. $\cos^{-1}\left(\frac{x}{a}\right) + \cos^{-1}\left(\frac{y}{b}\right) = c$

Answer: D

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205. $\frac{x^2 - 1}{y - 1} = xy\frac{dy}{dx}$

A. $3x^2 - 6\log x = 2y^3 - 3y^2 + c$

B. $3x^2 + 6\log x = 3y^3 - 2y^2 + c$

C. $3x^3 + 6\log x = y^3 - y^2 + c$

D. $3x^3 + 6\log x = 2y^3 - 3y^2 + c$

Answer: A

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206. $y^3dx - 4dy = x^2dy$

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

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

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

D. $y^4 - 16y = x^3 + c$

Answer: A

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207. $\frac{dy}{dx} + \frac{xy + y}{xy + x} = 0$

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

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

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

D. $x\log(y + 1) = y\log(x + 1) + c$

Answer: C

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208. $\frac{y^2}{x^2}\frac{dx}{dy} = \frac{y + 1}{x + 1}$

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

B. $\frac{1}{y} - \frac{1}{x} + \log\left(\frac{x}{y}\right) = c$

C. $y - x - \log y + \log x = c$

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

Answer: B

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209. $\left(x - y^2 x\right)dx - \left(y - x^2 y\right)dy = 0$

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

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

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

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

Answer: D

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210. $x(2y-1)dx+\left(x^2+1\right)dy=0$

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

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

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

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

Answer: C

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211. $xy\frac{dy}{dx}=y+2$

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

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

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

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

Answer: A

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212. $\frac{dy}{dx} = x\sqrt{25 - x^2}$

A. $3y + 2\sqrt{25 - x^2} = c$

B. $3y + \left(25 - x^2\right)^{3/2} = c$

C. $2y + 3\left(25 - x^2\right)^{3/2} = c$

D. $\sin^{-1}\left(\frac{x}{5}\right) = y + c$

Answer: B

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213. $y + \frac{dy}{dx}\sqrt{x^2 - 25} = 0$

A. $\log y = \sin^{-1}\left(\frac{x}{5}\right) + c$

B. $y\left(x + \sqrt{x^2 - 25}\right) = c$

C. $\sin^{-1}\left(\frac{x}{5}\right) = \log(cy)$

D. $3y + \left(25 - x^2\right)^{3/2}$

Answer: B

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214. $(1+x^2)dy = y^2dx$

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

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

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

D. $\tan^{-1} x = y^3 + c$

Answer: A

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215. If the general solution of $(x-2)dy - (6x+5)dx = 0$ is $y = 6x + k\log(x-2) + c$, then $k =$

A. 6

B. -12

C. 17

D. 27

Answer: C

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216. $\left(x^2 - yx^2\right)dy + \left(y^2 + xy^2\right)dx = 0$

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

B. $\log\left(\frac{x}{y}\right) = \frac{1}{x} - \frac{1}{y} + c$

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

D. $\log\left(\frac{x}{y}\right) = \frac{1}{x} + \frac{1}{y} + c$

Answer: D

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217. $\frac{dy}{dx} + 2\tan x = 0$

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

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

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

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

Answer: C

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218. $\frac{dy}{dx} = \tan^2 x$

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

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

C. $x + y = \sec^2 x + c$

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

Answer: B

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219. $\sec x dy + \sec y dx = 0$

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

B. $\sin x + \cos y = c$

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

D. $\sin x + \sin y = c$

Answer: D

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220. $\tan x \sec y dx + dy = 0$

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

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

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

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

Answer: D

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221. $\cos^2 ydx - \cos xdy = 0$

A. $\sin x + \cot y = c$

B. $\cos x + \tan y = c$

C. $\cos x + \cot y = c$

D. $\sec x - \cot y = c$

Answer: B

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222. $\sin x \sin ydx + \cos x \cos ydy = 0$

A. $\cos(x - y) = c$

B. $\sin y = c\cos x$

C. $\sin x = c\cos y$

D. $\cos x = c\sin y$

Answer: B

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223. $\cos x \cos y dy - \sin x \sin y dx = 0$

A. $\cos x = c\sin y$

B. $\cos x + \sin y = c$

C. $\cos x \sin y = c$

D. $\sec x . \cos y = c$

Answer: C

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224. $\sec^2 x \sin y dx + (1 + \tan x)\cos y dy = 0$

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

B. $\sin x \sin y = c \cos y$

C. $\sin x \cos y = c \cos x$

D. $(1 + \sin y)\tan x = c$

Answer: A

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225. $\frac{dy}{dx}\tan y = \sin x + \cos x$

A. $\sin x + \log(\sec y) = \cos x + c$

B. $\cos x - \log(\cos y) = \sin x + c$

C. $\cos x + \log(\cos y) = \sin x + c$

D. $\cos y + \log(\cos x) = \sin y + c$

Answer: B

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226. $\frac{dy}{dx} = 2(\sin x - \cos x)^{-2}$

A. $y - \frac{2}{1 - \tan x} = c$

B. $y = \cos x + \sin x + c$

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

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

Answer: A

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

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

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

C. $y=c\left(e^{4x}-1\right)$

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

Answer: B

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228. $e^{x-y}(\sin x + \cos x)dx + (\cos y - \sin y)dy = 0$

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

B. $e^x \sin x = ce^y \cos y$

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

D. $e^y \sin y - e^x \cos x = c$

Answer: C

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229. $e^{-x}\frac{dy}{dx} = y(1 + \tan x + \tan^2 x)$

A. $\log y = e^x \tan x + c$

B. $e^x \log y = \tan x + c$

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

D. $\log y + e^x \tan x = c$

Answer: A

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230. $\frac{dv}{r^2} = 4\pi dr,$ when $r = 0, v = 0$

A. $v = \frac{1}{3}\pi r^2 h$

B. $v = 4\pi r^3$

C. $v = \frac{4}{3}\pi r^3$

D. $v = 4\pi r^2 h$

Answer: C

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231. $\frac{dx}{x} + \frac{dy}{y} = 0$, when $x = 2, y = 3$

A. $xy = 6$

B. $2y = 3$

C. $3x = 2$

D. $6xy = 1$

Answer: A

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232. $\frac{dy}{dx} + \frac{y+2}{x+2} = 0$, when $x = 1, y = 2$

A. $xy + 8(x + y) = 2$

B. $xy + x + y = 16$

C. $xy + 2(x + y) = 8$

D. $xy - 8(x + y) = 2$

Answer: C

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233. $x\left(1 + y^2\right)dx + y\left(1 + x^2\right)dy = 0$ at $(0, 0)$

A. $\left(1 + x^2\right)\left(1 + y^2\right) = 0$

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

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

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

Answer: B

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234. $\frac{dy}{dx} - e^x = ye^x$, when $x = 0, y = 1$

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

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

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

D. $\log(1 + x) + e^y + \log 2 = 1$

Answer: A

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235. $\frac{dy}{dx} = 2e^x y^3$, when $x = 0, y = \frac{1}{2}$

A. $4e^{-x} + y^2 = 8$

B. $4e^x + y^2 = 8$

C. $4e^x + y^{-2} = 8$

D. $4e^y - x^{-2} = 8$

Answer: C

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236. $\sin\left(\frac{dy}{dx}\right) = a$, when $x = 0, y = 1$

A. $\sin\left(\frac{x-1}{y}\right)=a$

B. $\sin\left(\frac{y-1}{x}\right)=a$

C. $\sin\left(\frac{xy-1}{xy}\right)=a$

D. $\sin\left(\frac{x+1}{y}\right)=a$

Answer: B

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237. $\frac{1+e^x}{y}\frac{dy}{dx}=e^x,$ when $y=1, x=0$

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

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

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

D. $2y=1+e^x$

Answer: D

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238. Find the particular solutions of the following differential equation :

(1) xdx + ydy =0 , when x =3 , y =4

A. $x^2 + y^2 = 9$

B. $x^2 + y^2 = 16$

C. $x^2 + y^2 = 25$

D. $x^2 + y^2 = 50$

Answer: C

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239. $\frac{dy}{dx} - y = 0 \quad \text{at} \quad (0, 1)$

A. $y = \log x$

B. $y = e^x$

C. $\log_y x = 1$

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

Answer: B

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240. $\left(x^2 - x\right)\frac{dy}{dx} = y, \quad \text{at} \quad (2, 1)$

A. $2xy = x - 1$

B. $xy = x - 2$

C. $xy = 2(y - 1)$

D. $xy = 2(x - 1)$

Answer: D

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241. $1 + \frac{dy}{dx} = \cos(x + y)$, where $x + y = u$

A. $x + \cos u = c$

B. $x \sin u = c$

C. $x + \cot u = c$

D. $u - \sin x = c$

Answer: A

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242. $1 - \frac{dy}{dx} = \sec(x - y), \quad \text{where} \quad x - y = u$

A. $x + \cos u = c$

B. $x - \sin u = c$

C. $x + \cos u = c$

D. $u + \cos x = c$

Answer: B

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243. $\sec^2(x-2y)\left(1-2\frac{dy}{dx}\right)=1,$ where $x-2y=u$

A. $x-\sin y=c$

B. $x-\cos u=c$

C. $x-\tan u=c$

D. $u-\tan x=c$

Answer: C

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244. $x+y\frac{dy}{dx}=\sec\left(x^2+y^2\right),$ where $x^2+y^2=u$

A. $2x-\sin u=c$

B. $x-\sin 2u=c$

C. $2x = \tan u + c$

D. $2u = \cos x + c$

Answer: A

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

A. $\frac{y}{x} + \log x + c$

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

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

D. $y = x \log y + c$

Answer: C

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246. $\frac{dy}{dx} = \frac{y}{x} + \tan\left(\frac{y}{x}\right)$

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

B. $cx - \sin\left(\frac{y}{x}\right)$

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

D. $\frac{y}{x}.\cos\left(\frac{y}{x}\right) = c$

Answer: B

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247. $\left(x\frac{dy}{dx} - y\right)e^{y/x} = x^2\sec^2 x$

A. $e^{y/x} = \tan x + c$

B. $e^{y/x} \tan x = c$

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

D. $e^{-y/x} + \tan x = c$

Answer: A

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248. Solve the following differential equations: $xy\frac{dy}{dx} = x^2 - y^2$

A. $\frac{y^2}{x^2} = 2\log x + c$

B. $\frac{y}{x} = 2\log x + c$

C. $y = 2x\log x + c$

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

Answer: A

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

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

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

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

D. $\frac{x}{y} = \log x + c$

Answer: D

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250. $(e^y + 1)\cos x dx + e^y \sin x dy = 0$, where $y = 0, x = \frac{\pi}{4}$

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

B. $\sin x = \sqrt{2}(e^y + 1)$

C. $(e^y + 1)\sin x = \sqrt{2}$

D. None of these

Answer: C

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251. $\frac{dy}{dx} = (4x + y + 1)^2$

A. $\tan^{-1}\left(\frac{u}{2}\right) = 2x + c$

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

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

D. $\frac{u^3}{3} = \tan^{-1} x + c$

Answer: A

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252. General solution of $x^2 \frac{dy}{dx} + \sqrt{4 - y^2} = 0$ is

A. $y = \sin\left(c + \frac{1}{x}\right)$

B. $y = 4\sin\left(c + \frac{1}{x}\right)$

C. $y = 3\sin\left(c + \frac{1}{x}\right)$

D. $y = 2\sin\left(c + \frac{1}{x}\right)$

Answer: D

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253. If $y = a\sin 2x + b\cos 2x$ satisfies the equation $\frac{d^2y}{dx^2} = 6\sin 2x - \cos 2x$, then $(a, b) \equiv$

A. $\left(-\frac{3}{2}, \frac{1}{4}\right)$

B. $\left(\frac{3}{2}, -\frac{1}{4}\right)$

C. $\left(\frac{3}{2}, \frac{1}{4}\right)$

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

Answer: A

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254. The function $y = A\sin x + \cos x$ satisfies the equation $\frac{d^2y}{dx^2} + y = B$, where A, B are constants. If $\frac{dy}{dx} = 2$ when x = 0, then $(A, B) \equiv$

A. (2, 0)

B. (0, 2)

C. (2, 2)

D. (1, 1)

Answer: A

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255. If the function $y = e^{4x} + 2e^{-x}$ satisfies the differential equation $\frac{d^3y}{dx^3} + A\frac{dy}{dx} + By = 0$, then $(A, B) \equiv$

A. $(-13, 14)$

B. $(-13, -12)$

C. $(-13, 12)$

D. $(12, -13)$

Answer: B

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256. Differential equation of all tangents to the parabola $y^2 = 4ax$ is (A) $y = mx + \frac{a}{m}, m \neq 0$ (B) $y_1(yy_1 - x) = a$ (C) $xy_1^2 - yy_1 + a = 0$ (D) none of these

A. $y = mx + \frac{a}{m}, m \neq 0$

B. $y_1(yy_1 - x) = 0$

C. $x(y_1)^2 - yy_1 + a = 0$

D. $x(y_1)^2 - yy_1 - a = 0$

Answer: C

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257. Order and degree of the differential equation $\left(\frac{d^3y}{dx^3}\right)^{3/2} + \left(\frac{d^3y}{dx^3}\right)^{-2/3} = 0$ are respectively

A. 2, 9

B. 3, 6

C. 3, 4

D. 3, 1

Answer: D

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258. The degree of the differential equation

$$\left(\frac{d^3y}{dx^3}\right)^{2/3} + 4 - 3\frac{d^2y}{dx^2} + 5\frac{dy}{dx} = 0, \text{ is}$$

A. 3

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

C. 2

D. 6

Answer: C

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259. Determine the order and degree of each of the following differential equation. State also whether they are linear or non-linear: $y = px + \sqrt{a^2p^2 + b^2},\ where\ p = \frac{dy}{dx}$

A. 1

B. 2

C. 4

D. $\frac{1}{2}$

Answer: B

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260. The equation of the curve through the point (1,0) which satisfies the differential equatoin $\left(1 + y^2\right)dx - xydy = 0$, is

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

B. $x^2 - y^2 = 1$

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

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

Answer: B

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261. $xy\frac{dy}{dx} = \frac{1+y^2}{1+x^2}(1+x+x^2)$

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

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

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

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

Answer: C

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262. General solution of D.E. $\frac{dy}{dx} = \frac{2}{x+y}$ is

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

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

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

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

Answer: C

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263. The equation of family of a curve is $y^2 = 4a(x + a)$, then differential equation of the family is

A. $y\left(1 + y_1^2\right) = 2xy_1$

B. $y_2 + 2y_1 = 0$

C. $y\left(1 = y_1^2\right) = 2xy_1$

D. $y_1^3 + 3y_1 + y = 0$

Answer: C

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264. If $y = ae^{2x} + b\cos 2x + c\sin 2x$, then

A. $y_3 = 8y$

B. $y_3 - 2y_2 + 4y_1 - 8y = 0$

C. $y_3 + 2y_2 - 4y_1 + 8y = 0$

D. $y_3 + 8y = 0$

Answer: B

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265. Differential equation corresponding to the primitive $y = e^{cx}$ is

A. $y_1(y/x)\log x$

B. $y_1 = (y/x)\log y$

C. $y_1 = (x/y)\log x$

D. $y_1 = (x/y)\log y$

Answer: B

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266. Differential equation of the damily of curves $y = x.\sin(x + a)$ is

A. $xy_1 = x^2y^2 + A$

B. $xy_1 = y^4$

C. $(xy_1 - y)^2 + x^2y^2 + x^4$

D. $xy_1 = y^4$

Answer: C

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267. Differential equation $yy_1 + x = A$, where A is an arbitrary constant, represents a family of

A. circles centred on Y-axis

B. circles centred on X-axis

C. parabolas vertexed at the origin

D. ellipses centred at the origin

Answer: B

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268. Integrating factor of : $\frac{dy}{dx} + \frac{y}{x} = x^3 - 3x$ is

A. $\log x$

B. x

C. $-x$

D. e^x

Answer: B

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269. Integrating factor of the differential equation $(\cos x)\frac{dy}{dx} + y.\sin x = 1$ is

A. $\cos x$

B. $\tan x$

C. $\sec x$

D. $\sin x$

Answer: C

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270. Integrating factor of the differential equation $(x.\log x)\frac{dy}{dx} + y = 2\log x$ is

A. e^x

B. $\log x$

C. $\log(\log x)$

D. x

Answer: B

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271. General solution (GS) of $\frac{dy}{dx} + y.\cot x = \cos x$ is

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

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

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

D. $y.\sin x = x + c$

Answer: D

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272. General solution of the differential equation $(\cos x)\frac{dy}{dx} + y.\sin x = 1$ is

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

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

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

D. $y.\sin x = \sec x.\tan x + c$

Answer: B

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273. Solution of the differential equation $\frac{dy}{dx} + \frac{2y}{x} = 0$, where $y(1) = 1$, is

A. $y = 1/x^2$

B. $x = 1/y^2$

C. $x = 1/y$

D. $y = 1/x$

Answer: A

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274. The equation of curve passing through origin and satisfying the differential equation $(1+x^2)\frac{dy}{dx}+2xy=4x^2$, is

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

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

C. $3(1+x^2)y=4x^3$

D. none of these

Answer: C

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275. General solution of : $x\frac{dy}{dx} + y = x.\, e^x$ is

A. $xy = (x+1)e^x + c$

B. $xy = (x-1)e^x + c$

C. $xy = (1-x)e^x + c$

D. none of these

Answer: B

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276. Find the general solution of $\frac{dy}{dx} + ay = e^{mx}$

A. $(a+m)y = e^{mx} + c$

B. $ye^{ax} = me^{mx} + c$

C. $(a+m)y = e^{mx} + c.\, e^{-ax}$

D. None of these

Answer: C

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277. General solution of the differential eqution $\frac{dy}{dx} + \frac{y}{x} = x^2$ is

A. $y = \frac{1}{4}x^2$

B. $y = \frac{1}{4}x^3 + c$

C. $y = \frac{1}{4}x^3 + \frac{c}{x}$

D. none of these

Answer: C

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278. General solution of the differential equation $\frac{dy}{dx} = 1 + x + y$ is

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

B. $y = c.\, e^{x^2/2}$

C. $u = (x + c).\, e^{-x^2/2}$

D. none of these

Answer: D

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279. If $y(t)$ is a solution of $(1+t)\frac{dy}{dt} - ty + 1 = 0$ and $y(0) = 1$, then : $y(1) = \ldots$

A. $-\frac{1}{2}$

B. $e + \frac{1}{2}$

C. $e - \frac{1}{2}$

D. $\frac{1}{2}$

Answer: D

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280. The solution of the differential equation $\frac{dy}{dx} + 1 = e^{x+y}$, is

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

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

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

D. $(x-c).e^{x+y}+1=0$

Answer: D

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281. Order of the differential equation $\frac{d^2y}{dx^2}+5\frac{dy}{dx}+\int ydx=x^3$ is

A. 2

B. 3

C. 1

D. 4

Answer: B

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282. The degree and the order of the differential $y = x\left(\frac{dy}{dx}\right)^2 + \left(\frac{dx}{dy}\right)^2$ are respectively

A. 1, 1

B. 2, 1

C. 4, 1

D. 1, 4

Answer: C

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283. Find the differential equation of all straight lines, which are at a unit distance from origin.

A. $\left(y - x.\frac{dy}{dx}\right)^2 = 1 - \left(\frac{dy}{dx}\right)^2$

B. $\left(y + x.\frac{dy}{dx}\right)^2 = 1 + \left(\frac{dy}{dx}\right)^2$

C. $\left(y - x.\frac{dy}{dx}\right)^2 + 1 + \left(\frac{dy}{dx}\right)^2$

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

Answer: C

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284. Find the general solution of the differential equation

$(x \cos y)dy = e^x(x \log x + 1)dx.$

A. $\sin y = \frac{1}{x}e^x + c$

B. $\sin y + e^x . \log x + c = 0$

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

D. none of these

Answer: C

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285. Solution of the equation : $\sin^{-1}\left(\frac{dy}{dx}\right) = x + y$ is

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

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

C. $\tan(x+y)+\sec(x+y)+x+c=0$

D. none of these

Answer: B

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286. General solution of : $\frac{dy}{dx}=\sqrt{1-x^2-y^2+x^2y^2}$ is

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

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

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

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

Answer: A

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287. solution of the differential equation $xdy - ydx = \sqrt{x^2 + y^2}dx$ is

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

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

C. $y + \sqrt{x^2 + y^2} + cx^2 = 0$

D. none of these

Answer: B

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288. The solution of the differential $x(x-y)\frac{dy}{dx} = y(x+y)$, is

A. $\frac{x}{y} + \log(xy) = c$

B. $\frac{y}{x} + \log(xy) = c$

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

D. $\frac{y}{x} + x.\log y = c$

Answer: A

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289. The integrating factor of $\left(1+y^2\right)dx = \left(\tan^{-1}y - x\right)dy$ is -

A. $\tan^{-1}y$

B. $e^{\tan^{-1} y}$

C. $\frac{1}{1+y^2}$

D. $\frac{1}{x(1+y^2)}$

Answer: B

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290. An integrating factor of the differential equation

$(1+y+x^2y)dx+(x+x^3)dy=0$ is

A. $\log x$

B. x

C. e^x

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

Answer: B

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291. Solution of the DE : $x\frac{dy}{dx} + y = \frac{1}{x^2}$ at $(1, 2)$ is

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

B. $x^2y + 1 = 0$

C. $xy + 1 = 3x$

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

Answer: A

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292. An integrating factor of the DE :

$(1+x)\frac{dy}{dx} - xy = 1 - x$ is

A. $(1+x).\, e^{-x}$

B. $\log(1+x)$

C. $1+x$

D. $x.\, e^{x}$

Answer: A

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293. If the integrating factor of the differential equation

$\frac{dy}{dx} + P$ (x) y = Q (x) is x , then P (x) is

A. x

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

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

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

Answer: C

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294. Solution of the DE : $x(\log x).\ \frac{dy}{dx} + y = 2(\log x)$ is

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

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

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

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

Answer: C

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295. The integrating factor of the differential equation $(1-x^2)\frac{dy}{dx} - xy = 1$, is

A. $-x$

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

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

D. $\frac{1}{2}.\log(1-x^2)$

Answer: C

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296. The solution of $\frac{dy}{dx} + P(x)y = 0$, is

A. $y = c.\, e^{\int P dx}$

B. $x = c.\, e^{-\int P dy}$

C. $y = c.\, e^{-\int P dx}$

D. $x = c.\, e^{\int P dy}$

Answer: C

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297. The differential equation of all non-vertical lines in a plane, is

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

B. $\frac{d^2x}{dy^2} = 0$

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

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

Answer: A

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298. The order and degree of the differential equation $\left(1 + 3\frac{dy}{dx}\right)^{2/3} = 4\frac{d^3y}{dx^3} are$

A. $\left(1, \frac{2}{3}\right)$

B. $(3, 1)$

C. $(3, 3)$

D. $(1, 2)$

Answer: C

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299. The solution of differential equation

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

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

B. $2x^{\tan^{-1}y}=e^{2\tan^{-1}y}+C$

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

D. $xe^{2\tan^{-1}y}=e^{\tan^{-1}y}+C$

Answer: B

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

A. 2, 1

B. 1, 2

C. 3, 2

D. 2, 3

Answer: B

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301. From the differential equation of the family of curves given by $x^2 + y^2 - 2ay = a^2$, where a is an arbitrary constant.

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

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

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

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

Answer: C

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

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

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

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

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

Answer: B

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303. The differential equation representing the family of curves $y^2 = 2c(x + \sqrt{c})$, where c is a positive parameter, is of (a) order 1 (b) order 2 (c) degree 3 (d) degree 4

A. order 2, degree 1

B. order 1, degree 3

C. order 1, degree 2

D. order 1, degree 2

Answer: B

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304. The differential equation whose solution is $Ax^2 + By^2 = 1$, where A and B are arbitrary constants, is of (a) second order and second degree (b) first order and second degree (c) first order and first degree (d) second order and first degree

A. first order and second degree

B. first order and first degree

C. second order and first degree

D. second order and second degree

Answer: C

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305. The differential equation of the family of circles passing through the origin and having 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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306. Solution of the differential equation

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

satisfying the condition $y(1) = 1$, is

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

B. $y = \log x + x$

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

D. None of these

Answer: A

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307. Differential equation of the family of circles with fixed radius 5 units, and centre on the line $y = 2$, is

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

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

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

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

Answer: D

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

A. $y' = y^2$

B. $y'' = yy'$

C. $yy'' = y'$

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

Answer: D

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309. If : $\frac{dy}{dx} = (y+3) > 0$ and $y(0) = 2$, then : $y(-\log 2) =$

A. 5

B. 13

C. -2

D. None of these

Answer: D

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310. At present a firm is manufacturing 2000 items. It is estimated that the rate of change of production p with respect to additional nuber of workers x is given by $\frac{dp}{dx} = 100 - 12\sqrt{x}$. If the firm employes 25 more workers,

A. 2500

B. 3000

C. 3500

D. 4500

Answer: C

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311. If $y = y(x)$ and $\left(\frac{2+\sin x}{y+1}\right)\frac{dy}{dx} = -\cos x, y(0) = 1,$ then $y\left(\frac{\pi}{2}\right)$ equals (A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) $-\frac{1}{3}$ (D) 1

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

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

C. $-\frac{1}{3}$

D. 1

Answer: A

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312. For the primitive integral equation $ydx + y^2dy = xdy; x \in R, y > 0, y(1) = 1,$ then $y(-3)$ is (a) 3 (b) 2 (c) 1 (d) 5

A. 3

B. 2

C. 1

D. 5

Answer: A

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313. The order of the differential equation whose general solution is given by $y = (C_1 + C_2)\cos(x + C_3) - C_4 e^{x+4_5}$, where C_1, C_2, C_3, C_4, C_5 , are arbitrary constants, is (a) 5 (b) 4 (c) 3 (d) 2

A. 5

B. 4

C. 3

D. 2

Answer: C

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314. 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. $2.\log 18$

B. $\log 9$

C. $\frac{1}{2}.\log 18$

D. $\log 18$

Answer: A

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315. 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 (1) $400 - 300e^{t/2}$ (2) $300 - 200e^{-t/2}$ (3) $600 - 500e^{t/2}$ (4) $400 - 300e^{-t/2}$

A. $400 - 300e^{t/2}$

B. $300 - 200e^{-t/2}$

C. $600 - 500e^{t/2}$

D. $400 - 300e^{-t/2}$

Answer: A

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MULTIPLE CHOICE QUESTIONS (PREVIOUS YEARS MHT - CET EXAM QUESTIONS)

1. The solution of $\log. \frac{dy}{dx} = x$ when $y = 1$ and $x = 0$ is :

A. $y = e^x$

B. $y = e^x + 2$

C. $y = e^x - 1$

D. $y = e + 1$

Answer: A

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2. The differential equation whose general solution is $y = a\cos(\log x) + b\sin(\log x)$ is :

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

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

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

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

Answer: C

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3. The order and degree of the differential equation $\frac{d^3y}{dx^3} = \sqrt[5]{1 + \left(\frac{dy}{dx}\right)}$ is :

A. 3, 7

B. 3, 1

C. 3, 5

D. 1, 3

Answer: C

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4. The general solution of the D.E. $\frac{dy}{dx} = \frac{x + y + 1}{x + y - 1}$ is :

A. $y = x - 2\log|x + y| + c$

B. $x = y - 2\log|x + y| + c$

C. $x = y + \log|x + y| + c$

D. $y = x + \log|x + y| + c$

Answer: D

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5. The order and degree of D.E.

$\frac{d^2y}{dx^2} = \sqrt[3]{1 + \left(\frac{dy}{dx}\right)^2}$ are

A. 3, 2

B. 3, 1

C. 2, 3

D. 2, 2

Answer: C

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6. The differential equation of the family of straight line $y = mx + \frac{4}{m}$, where m is the parameter, is

A. $x\frac{dy}{dx} = 0$

B. $(x - y)\frac{dy}{dx} = 4$

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

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

Answer: D

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7. The differential equation of family of circles whose centre lies on x-axis, is

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

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

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

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

Answer: D

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8. The solution of the differential equation $y(1+\log x)\frac{dx}{dy} - x\log x = 0$ is

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

B. $x\log x = yc$

C. $y(1+\log x) = c$

D. $\log x - y = c$

Answer: B

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9. The order of the differential equation whose solution is $ae^x + be^{2x} + ce^{3x} + d = 0$ is

A. 1

B. 2

C. 3

D. 4

Answer: C

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10. If the bacteria in a culture increase continuously at a rate proportional to the number present and initial number is N, then the number present at time t is

A. $2Ne^{kt}$

B. $\frac{N}{4}e^{kt}$

C. Ne^{kt}

D. $\frac{N}{2}e^{kt}$

Answer: C

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

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

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

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

D. None of these

Answer: D

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12. the differential equation representing all the the tangents to the parabola $y^2 = 2x$ is

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

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

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

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

Answer: A

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13. Order and degree of the differential equation

$$\frac{dy}{dx} = 3y + \sqrt[4]{1 + 5\left(\frac{d^2y}{dx^2}\right)}$$ is

A. 2, 1

B. 3, 2

C. $2, \frac{1}{2}$

D. $2, \frac{3}{2}$

Answer: A

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TEST YOUR GRASP

1. The degree and order of the differential equation $t = px + \sqrt[3]{a^2p^2 + b^2}$, where $p = \dfrac{dy}{dx}$ are respectively

A. 1

B. 2

C. 4

D. 3

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2. Determine the order and degree of each of the following differential equation. State also whether they are linear or non-linear: $2\dfrac{d^2y}{dx^2} + 3\sqrt{1 - \left(\dfrac{dy}{dx}\right)^2} - y = 0$

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3. $\left(\frac{d^3y}{dx^3}+x\right)^{5/2}=\left(\frac{d^2y}{dx^2}\right)^7$ Find order and degree.

A. 2, 7

B. 3, 7

C. 5, 7

D. 3, 5

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4. $\sqrt[3]{\frac{dy}{dx}\sqrt{\frac{d^3y}{dx^3}}}=5$

A. 3, 3

B. 3, 1

C. 3, 6

D. 3, 2

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5. The differential equation obtained by eliminating a and b from $y = ae^{bx}$ is

A. $y_2 + y$

B. $y_2^2 = yy_1$

C. $y_1^2 = yy_2$

D. $y^2 = y_1 y_2$

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6. The differential equation obtained by eliminating the constants a and b from $xy = ae^x + be^{-x} + x^2$ is

A. $xy_2 + 2y_1 + x^2 - xy + 2 = 0$

B. $xy_2 + 2y_1 = x^2 - xy + 2$

C. $xy_1 + 2y_2 x^2 - xy + 2 = 0$

D. $y_2 = 2xy$

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7. The differential equation satisfying all the curves $y = ae^{2x} + be^{-3x}$, where a and b are arbitrary constants, is

A. $y_2 - y_1 - 6y = 0$

B. $y_2 - y_1 + 6y = 0$

C. $y_2 + y_1 - 6y = 0$

D. $y_1 - y_2 + 6y = 0$

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8. $y = e^x(c_1 + c_2x)$

A. $(y_1)^2 - 2y_1 + 1 = 0$

B. $y_2 - 2y + y = 0$

C. $y_2 + 2y_1 - y = 0$

D. $y_2 = 2y_1 + y$

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9. The differential equation of $y = c^2 + \frac{c}{x}$ is

A. $u = x^4(y_1)^2 - xy_1$

B. $y_1 = x^4y^2 - xy$

C. $x^4 = y(y_1)^2 - xy$

D. $y = y_1^2 + \frac{y_1}{x}$

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10. The general solution of the differential equaiton $(1+y^2)dx+(1+x^2)dy=0$, is

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

B. $x+y=c(1+xy)$

C. $x-y=c(1-xy)$

D. $x+y=c(1+xy)$

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11. $xy\frac{dy}{dx}=\frac{1+y^2}{1+x^2}(1+x+x^2)$

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

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

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

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

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12. If the general solution of $(x-2)dy - (6x+5)dx = 0$ is $y = 6x + k\log(x-2) + c,$ then $k =$

A. 6

B. -12

C. 17

D. 27

Answer: C

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13. Find the particular solution of the differential equation $(1+x^2)\sec^2 ydy + 2x\tan ydx = 0$, it is given that at $x = 1$, $y = \pi/4$.

A. $(1+x^2)\tan y = 0$

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

C. $(1+x^2)\cot y = 0$

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

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14. The slope of a curve at any point (x, y) on it is $(4x - 3)$. If the curve passes through the point (1, 3), then its equation is

A. $y = 2x^3 - 3x + 4$

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

C. $x = 2y^2 - 3y + 4$

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

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