MATHS

BOOKS - NIKITA MATHS (HINGLISH)

Differential Equation

Multiple Choice Question

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

A. 1 and 2

B. 1 and 1

C. $1 \text{ and } \frac{1}{2}$

D. 2 and 1

Answer: B

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2. Order and degree of the differential equation $y\frac{dy}{dx} = \frac{x}{\frac{dy}{dx} + \left(\frac{dy}{dx}\right)^3}$ respectively are

A. 1 and 1

B. 1 and 2

C. 1 and 3

D. 1 and 4

Answer: D

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3. Order and degree of the differential equation $\frac{dy}{dx} = \frac{2\sin x + 3}{\frac{dy}{dx}}$ respectively are

A. 1 and 1

B. 1 and 2

C. 2 and 1

D. 2 and 2

Answer: B

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4. Degree and order of the differential equation $\frac{d^2y}{dx^2} = \left(\frac{dy}{dx}\right)^2$ are respectively

A. 2 and 2

B. 1 and 1

C. 2 and 1

D. 1 and 1

Answer: C

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5. Order and degree of the differential equation $\frac{d^2x}{dt^2} + \left(\frac{dx}{dt}\right)^2 + 7 = 0$ respectively are

A. 2 and 2

B. 1 and 1

C. 2 and 1

D. 1 and 2

Answer: C

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6. Order and degree of the differential equation $\begin{vmatrix} x^3 & y^2 & 3 \\ 2x^2 & 3y\frac{dy}{dx} & 0 \\ 5x & 2\left(y\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^2\right) & 0 \end{vmatrix}$ =0 respectively are

A. 1 and 1

B. 1 and 2

C. 2 and 2

D. 2 and 1

Answer: D

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7. Order and degree of the differential equation $\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 2\sin x$ respectively are

A. 1 and 2

B. 1 and 1

C. 2 and 1

D. 2 and 2

Answer: C

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8. Order and degree of the differential equation $\left(\frac{d^2y}{dx^2}\right)^2 + \left(\frac{dy}{dx}\right)^3 = e^x$ respectively are

A. 2 and 1

B. 2 and 2

C. 1 and 3

D. 2 and 3

Answer: B

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9. Order and degree of the differential equation $\frac{d^2y}{dx^2} = \sqrt{1 + \left(\frac{dy}{dx}\right)^3}$ respectively are

A. 2 and 2

B. 2 and 1

C. 1 and 3

D. 2 and 3

Answer: A

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

A. 2 and 2

B. 2 and 1

C. $2 \text{ and } \frac{1}{2}$

D. 2 and 3

Answer: D

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11. The order and degree of the differential equation $\frac{d^2y}{dx^2} = \sqrt[3]{1 - \left(\frac{dy}{dx}\right)^4}$ are respectively

A. 1 and 4

B. 2 and 1

C. 2 and 3

D. 2 and 4

Answer: C

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12. Select and write the correct answer from the given alternatives in each of the following sub-questions :

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

A. 3 and 7

B. 3 and 2

C. 7 and 3

D. 2 and 3

Answer: B

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13. Order and degree of the differential equation $(y'{}'{}')^2 + 2(y'{}'{}')^2 + 3y'4y = 0$ respectively are

A. 3 and 2

B. 2 and 2

C. 1 and 1

D. 3 and 1

Answer: A

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14. The order and degree of the differential equation

$$\rho = \frac{\left\{1 + \left(\frac{dy}{dx}\right)^2\right\}^{3/2}}{\frac{d^2y}{dx^2}}$$ are respectively

A. 2 and 2

B. 2 and 3

C. 2 and 1

D. 1 and 4

Answer: A

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15. Order and degree of the differential equation

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

A. 1 and 2

B. 2 and 3

C. $1 \text{ and } \frac{1}{2}$

D. $2 \text{ and } \frac{3}{2}$

Answer: B

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16. Order and degree of the differential equation $\frac{d^2y}{dx^2} + \frac{dy}{dx} + x = \sqrt{1 + \frac{d^3y}{dx^3}}$ respectively are

A. 3 and 1

B. 3 and 2

C. 3 and 4

D. $3 \text{ and } \frac{1}{2}$

Answer: A

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17. Order and degree of the differential equation $\frac{d^3y}{dx^3}=5\sqrt{1-\left(\frac{dy}{dx}\right)^2}$ respectively are

A. 3 and 1

B. 3 and 3

C. 3 and 2

D. 3 and 5

Answer: D

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18. Order and degree of the differential equation $\left(\frac{d^3y}{dx^3}+x\right)^{\frac{5}{2}}=\frac{d^2y}{dx^2}$ respectively are

A. 3 and 5

B. 2 and 2

C. 2 and 1

D. 3 and 2

Answer: A

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19. Order and degree of the differential equation $\left(\frac{d^3y}{dx^3}\right)^{\frac{1}{6}}\left(\frac{dy}{dx}\right)^{\frac{1}{3}}=5$ respectively are

A. $3 \text{ and } \frac{1}{6}$

B. $1 \text{ and } \frac{1}{3}$

C. 1 and 3

D. 3 and 1

Answer: D

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20. Order and degree of the differential equation $\left(\frac{d^2y}{dx^2}\right)^5 + \frac{4\left(\frac{d^2y}{dx^2}\right)^3}{\frac{d^3y}{dx^3}} + \frac{d^3y}{dx^3} = x^2 - 1$ respectively are

A. 3 and 2

B. 3 and 1

C. 3 and 5

D. 3 and 3

Answer: A

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21. Order and degree of the differential equation $\frac{d^4y}{dx^4} = \left(1 + \left(\frac{dy}{dx}\right)^2\right)^3$ respectively are

A. 4 and 6

B. 1 and 6

C. 4 and 3

D. 4 and 1

Answer: D

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22. Which of the following differential equation has the same order and degree?

A. $\frac{d^4y}{dx^4}+8\left(\frac{dy}{dx}\right)^6+5y=e^x$

B. $5\left(\frac{d^3y}{dx^3}\right)^4+8\left(1+\frac{dy}{dx}\right)^2+5y=x^8$

C. $\left(1+\left(\frac{dy}{dx}\right)^3\right)^{\frac{2}{3}}=4\frac{d^3y}{dx^3}$

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

Answer: C

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23. The order and degree of the differential equation $\frac{d^2y}{dx^2} + \cos\left(\frac{dy}{dx}\right) = 0$ respectively are

A. both degree and other can not be defined

B. order =2, degree can not be defined

C. 2 and 1

D. degree =2, order can not be defined

Answer: B

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24. The order and degree of the differential equation $e^{\frac{dy}{dx}} + \frac{dy}{dx} = x$ respectively are

A. 1 and 1

B. both order and degree can not be defined

C. order =1, degree can not be defined

D. degree =1, order can not be defined

Answer: C

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25. The order of the differential equation whose solution is $ae^x + be^{2x} + ce^{3x} + d = 0$ is

A. 4

B. 2

C. 3

D. 1

Answer: A

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26. The order of the differential equation whose solution is $x^2 + y^2 + 2gx + 2fy + c = 0$ is

A. 1

B. 2

C. 3

D. 4

Answer: C

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27. The differentiala equation representing the family of curves $y^2 = 2k(x + \sqrt{k})$ where k is a positive parameter, is of

A. order=1,degree=2

B. order 2, degree=2

C. order=1,degree=3

D. order2,degree=1

Answer: C

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28. The differential equation of all circles in the first quadrant which touch the coordiante axes is of order

A. 1

B. 2

C. 3

D. 4

Answer: A

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29. Find the differential equation of all parabolas whose axis are parallel to the x-axis.

A. 3

B. 1

C. 4

D. 2

Answer: A

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30. The order of the differential equation of the family of parabolas whose axis is the X-axis is

A. 2 and 1

B. 1 and 2

C. 3 and 2

D. 3 and 1

Answer: B

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31. If radium decoposes at a rate proportional to tha amount Q present, then the differential equation is

A. $\frac{dQ}{dt} = kQ, k > 0$

B. $\frac{dQ}{dt} = -kQ, k > 0$

C. $\frac{dQ}{dt} = Q$

D. $\frac{dQ}{dt} = -Q$

Answer: B

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32. The rate of decay of the mass of a radioactive substance at any time is k times its mass at that time. The differential equation satisfied by the mass of the substance is

A. $\frac{dm}{dt}+K=0, K>0$

B. $\frac{dm}{dt}-K=0, K>0$

C. $\frac{dm}{dt}+Km=0, K>0$

D. $\frac{dm}{dt}-Km=0, K>0$

Answer: C

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33. A particle is moving along X-axis Its acceleration at time t is proportional to its velocity at that time. The differential equation of the motion of the particle is

A. $\frac{d^2x}{dt^2}-k\frac{dx}{dt}=0, k>0$

B. $\frac{d^2x}{dt^2} + k\frac{dx}{dt} = 0, k > 0$

C. $\frac{d^2x}{dt^2} - k = 0, k > 0$

D. $\frac{d^2x}{dt^2} + k = 0, k > 0$

Answer: A

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34. The differntial equation of all straight line passing through origin is

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

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

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

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

Answer: C

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35. The differential equation of all lines parallel to the line 3x+2y+5=0 is

A. $3\frac{dy}{dx}+2=0$

B. $3\frac{dy}{dx}-2=0$

C. $2\frac{dy}{dx}+3=0$

D. $2\frac{dy}{dx}-3=0$

Answer: C

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36. The differential equation of the family of lines where length of the normal form origin is p and the inclination of the normal is α, is

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

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

C. $\frac{dy}{dx}=\cot\alpha$

D. $\frac{dy}{dx}=-\cot\alpha$

Answer: B

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37. The differential equation of all non-vertical lines in a plane, is

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

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

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

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

Answer: C

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38. The differential equation of all non-horizontal lines in a plane is (a) $(b)(c)(d)\frac{(e)(f)d^{(g)2(h)}(i)y}{j}\left((k)d(l)x^{(m)2(n)}(o)\right)(p)(q)(r)$ (s) (b) $(t)(u)(v)\frac{(w)(x)d^{(y)2(z)}(aa)x}{bb}\left((cc)d(dd)y^{(ee)2(ff)}(gg)\right)(hh)(ii) = 0(jj)$

(kk) (c) $(d)(e)(f)\frac{(g)dy}{h}((i)dx)(j)(k) = 0(l)$ (m) (d)

$(n)(o)(p)\frac{(q)dx}{r}((s)dy)(t)(u) = 0(v)$ (w)

A. $\frac{d^2x}{dy^2} = 0$

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

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

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

Answer: A

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39. If the slope of the tangent is equal to the square of tha abscissa of the point on the curve, then the differential equation is

A. $\frac{dy}{dx} = kx^2$

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

C. $\frac{dx}{dy} = kx^2$

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

Answer: B

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40. The differential equation of all lines having x-intercept a and y-intercept b is

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

B. $\frac{dy}{dx} = \frac{b}{a}$

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

D. $a\frac{d^2y}{dx^2} = b$

Answer: C

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41. The differential equation of all straight lines passing through the point (1,-1) is

A. $y=(x+1)\frac{dy}{dx}+1$

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

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

D. $y=(x-1)\frac{dy}{dx}-1$

Answer: D

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42. 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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43. The differential equation of the family of fixed radii r with centers on the X-axis is

A. $y\frac{dy}{dx} + y = r$

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

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

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

Answer: C

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44. Find the differential equation of the family of circles whose centres lie on X-axis.

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

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

C. $\left(\frac{dy}{dx}\right)^2 - y\frac{d^2y}{dx2} - 1 = 0$

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

Answer: D

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45. Form the differential equation of the family of circles touching the x-axis at origin.

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

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

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

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

Answer: B

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46. The differential equation of all circles whose radius is 5 centre is any point (h,k) is

A. $25\left(\frac{d^2y}{dx^2}\right) + \left(1 + \left(\frac{dy}{dx}\right)^2\right)^2 = 0$

B. $25\left(\frac{d^2y}{dx^2}\right) - \left(1 + \left(\frac{dy}{dx}\right)^2\right)^2 = 0$

C. $25\left(\frac{d^2y}{dx^2}\right) + \left(1 + \left(\frac{dy}{dx}\right)^2\right)^3 = 0$

D. $25\left(\frac{d^2y}{dx^2}\right) - \left(1 + \left(\frac{dy}{dx}\right)^2\right)^3 = 0$

Answer: D

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47. The differential equation for all circles with centre (h,0) and radius r,h and r being arbitary constants is

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

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

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

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

Answer: A

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48. the family of circles having their centres on the line y=10 and touching the X-axis.

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

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: A

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

A. $(y-10)^2\left(\frac{dy}{dx}\right)^2 + y^2 + 20y = 0$

B. $(y-10)^2\left(\frac{dy}{dx}\right)^2 - y^2 + 20y = 0$

C. $(y-10)^2\left(\frac{dy}{dx}\right)^2 + y^2 - 20y = 0$

D. $(y-10)^2\left(\frac{dy}{dx}\right)^2 - y^2 - 20y = 0$

Answer: C

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50. Obtain the differential equation of the family of circles passing through the point (a,0) and (-a,0).

A. $(y-2)\left(\frac{dy}{dx}\right)^2 = 25 + (y^2-2)^2$

B. $(y-2)^2\left(\frac{dy}{dx}\right)^2 = 25 - (y^2-2)^2$

C. $(y-2)^2\left(\frac{dy}{dx}\right)^2 = 25 + (y^2-2)^2$

D. $(y-2)\left(\frac{dy}{dx}\right)^2 = 25 - (y^2-2)^2$

Answer: B

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51. The differential equation of all circles which passes through the origin and whose centers lie on Y-axis is

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

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

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

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

Answer: C

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52. The differential equation of all circles which passes through the origin and whose centers lie on Y-axis is

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

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

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

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

Answer: A

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53. The differential equation of all circles which passes through the origin and whose centers lie on Y-axis is

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

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

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

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

Answer: D

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54. Form the differential equation of the family of circles touching the y-axis at origin.

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

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

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

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

Answer: B

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55. Form the differential equation representing the parabolas having vertex at the origin and axis along positive direction of x-axis.

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

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

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

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

Answer: B

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56. Fid the differential equation of all the parabolas with latus rectum $'4a'$ and whose axes are parallel to x-axis.

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

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

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

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

Answer: C

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57. Show that the differential equation of all parabolas $y^2=4a(x-b)$ is given by

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

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

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

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

Answer: C

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58. The differential equation of all parabolas whose axis are parallel to the y-axis is (a) $(b)(c)(d)\frac{(e)(f)d^{(g)3(h)}(i)y}{j}\left((k)d(l)x^{(m)3(n)}(o)\right)(p)(q)=0(r)$ (s) (b) $(t)(u)(v)\frac{(w)(x)d^{(y)2(z)}(aa)x}{bb}\left((cc)d(dd)y^{(ee)2(ff)}(gg)\right)(hh)(ii)=C(j$

(kk) (c) *[Math Processing Error]* (ii) (d) *[Math Processing Error]* (ggg)

A. $\frac{d^3y}{dx^3}=0$

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

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

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

Answer: A

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59. Form the differential equation of the family of parabolas having vertex at origin and axis along positive y-axis.

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

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

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

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

Answer: D

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60. The differential equation of all parabolas whose axis are parallel to the y-axis is (a) $(b)(c)(d)\frac{(e)(f)d^{(g)3(h)}(i)y}{j}\left((k)d(l)x^{(m)3(n)}(o)\right)(p)(q)=0(r)$ (s) (b)

$(t)(u)(v)\frac{(w)(x)d^{(y)2(z)}(aa)x}{bb}\Big((cc)d(dd)y^{(ee)2(ff)}(gg)\Big)(hh)(ii) = C(jj$

(kk) (c) *[Math Processing Error]* (ii) (d) *[Math Processing Error]* (ggg)

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

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

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

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

Answer: A

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61. The differential equation $\frac{d^2y}{dx^2} = 2$ represents which of the following curve?

A. A straight line

B. A cirle

C. A parabola whose axis is parallel to Y-axis

D. A parallel to X-axis

Answer: C

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62. The differential equation for all ellips whose major axis is twice its minor axis is

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

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

C. $4y\frac{dy}{dx} - x = 0$

D. $4y\frac{dy}{dx} + x = 0$

Answer: D

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63. The equation of the ellips is $\frac{x^2}{36}+\frac{y^2}{16}=k$. The differential equation of the ellips whose length of major and minor axes half the lenghts of the given ellipse respectively, is

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

B. $2x-3y\frac{dy}{dx}=0$

C. $4x+9y\frac{dy}{dx}=0$

D. $4x-9y\frac{dy}{dx}=0$

Answer: C

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64. The differential equation satisfied by $\sqrt{1-x^2}+\sqrt{1-y^2}=a(x-y)$, a is arbitary constant

A. $\frac{dy}{dx}=\sqrt{\frac{1-y^2}{1-x^2}}$

B. $\frac{dy}{dx}=-\sqrt{\frac{1-y^2}{1-x^2}}$

C. $\frac{dy}{dx} = \sqrt{\frac{1-x^2}{1-y^2}}$

D. $\frac{dy}{dx} = -\sqrt{\frac{1-x^2}{1-y^2}}$

Answer: A

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65. Consider the equation $\frac{x^2}{a^2+\lambda} + \frac{y^2}{b^2+\lambda} = 1,$ where a and b are specified constants and λ is an arbitrary parameter. Find a differential equation satisfied by it.

A. $\frac{dy}{dx} = \sqrt{\frac{1-y^2}{1-x^2}}$

B. $\frac{dy}{dx} = -\sqrt{\frac{1-y^2}{1-x^2}}$

C. $\frac{dy}{dx} = \sqrt{\frac{1-x^2}{1-y^2}}$

D. $\frac{dy}{dx} = -\sqrt{\frac{1-x^2}{1-y^2}}$

Answer: C

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66. The differential equation for $x^3 + y^3 = 4ax$ is

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

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

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

D. $3xy^2 \frac{dy}{dx} - 2x^3 - y^3 = 0$

Answer: B

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67. Form of the differential equation of all family of lines $y = mx + \frac{4}{m}$ by eliminating the arbitrary constant m is

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

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

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

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

Answer: B

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68. The differential equation for $y^2=(x+A)^3$ is

A. $8\left(\frac{dy}{dx}\right)^3+18y=0$

B. $8\left(\frac{dy}{dx}\right)^3-18y=0$

C. $8\left(\frac{dy}{dx}\right)^3+27y=0$

D. $8\left(\frac{dy}{dx}\right)^3-27y=0$

Answer: D

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

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

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

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

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

Answer: A

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70. The differential equation, which represents the family of plane curves

$y = e^{cx}$

A. $x\frac{dy}{dx} + y\log y = 0$

B. $x\frac{dy}{dx} - y\log y = 0$

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

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

Answer: B

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71. The differential eqution for $\frac{x}{a} + \frac{y}{b} = 1$ is

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

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

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

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

Answer: B

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72. From the differential equation by eliminating A and B in $Ax^2 + By^2 = 1$

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

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

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

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

Answer: B

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

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

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

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

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

Answer: A

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74. The differential equation of the family of curves $y = c_1 e^x + c_2 e^{-x}$ is

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

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

C. $\frac{d^2y}{dx^2} + 1 = 0$

D. $\frac{d^2y}{dx^2} - 1 = 0$

Answer: B

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75. The differential equation for $y = Ae^{3x} + Be^{-3x}$ is

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

B. $\frac{d^2y}{dx^2} - 3y = 0$

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

D. $\frac{d^2y}{dx^2} + 3y = 0$

Answer: A

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76. The differential equation for $y = e^x(a + bx)$ is

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

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

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

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

Answer: C

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77. The differential equation for $y = ae^{x} + be^{-2x}$ is

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

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

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

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

Answer: C

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78. The differential equation for $y = Ae^{3x} + Be^{2x}$ is

A. $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 0$

B. $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} - 6y = 0$

C. $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} - 6y = 0$

D. $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 6y = 0$

Answer: A

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79. If $y = e^{ax} \sin bx$, then $\frac{d^2y}{dx^2} - 2a\frac{dy}{dx} + a^2y =$

A. $-a^2y$

B. $-b^2y$

C. $-ay$

D. $-by$

Answer: B

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80. The differential equation satistied by the family of curves $y - ax\cos\left(\frac{1}{x} + b\right)$, where a,b are parameters, is

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

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

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

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

Answer: B

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81. The differential equation for $y = a\sin(5x + c)$ is

A. $\frac{d^2y}{dx^2} + 25y = 0$

B. $\frac{d^2y}{dx^2} - 25y = 0$

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

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

Answer: A

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82. The differential equation for $y = c_1 \sin x + c_2 \cos x$ is

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

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

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

D. $\frac{d^2x}{dy^2} = 0$

Answer: B

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

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

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

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

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

Answer: A

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84. The differential equation for $y = e^x(a\cos x + b\sin x)$ is

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

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

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

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

Answer: C

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85. $xy = \log y + c$ is a solution of the differential equation

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

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

C. $\frac{dy}{dx} = \frac{-y}{1 - xy}$

D. $\frac{dy}{dx} = \frac{y}{1 - xy}$

Answer: B

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86. $y = x^m$ is a solution of the differential equation

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

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

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

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

Answer: B

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87. $y\sec x=\tan x+c$ is a solution of the differential equation

A. $\frac{dy}{dx}+y\tan x+\sec x=0$

B. $\frac{dy}{dx}+y\tan x-\sec x=0$

C. $\frac{dy}{dx}-y\tan x+\sec x=0$

D. $\frac{dy}{dx}-y\tan x-\sec x=0$

Answer: B

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88. $y = (\sin^{-1} x)^2 + c$ is a solution of the differential equation

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

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

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

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

Answer: D

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89. Verify the solution problems: Show that $y = e^{-x} + ax + b$ is solution of the differential equation $e^x\frac{d^y}{dx^2} = 1$

A. $\frac{d^2y}{dx^2} = e^{-x}$

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

C. $\frac{d^2y}{dx^2} = -e^{-x}$

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

Answer: A

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90. y=logx+c is a solution of the differential equation

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

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

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

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

Answer: D

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91. Solution of the differtial equation $y - x\frac{dy}{dx} = 0$ is

A. xy=0

B. y=cx

C. xy=0

D. y=x

Answer: B

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92. The solution of the differential equationn $\frac{d\theta}{dt} = -k(\theta - \theta_0)$ where k is constant, is ....

A. $\theta = \theta_0 + ce^{-kt}$

B. $\theta = \theta_0 + ce^{kt}$

C. $\theta = \theta_0 + ke^{-kt}$

D. $\theta = \theta_0 + ke^{kt}$

Answer: A

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93. Solution of the differential equation $\frac{dy}{dx} = \frac{y(1+x)}{x(y-1)}$ is

A. $\log|xy| + x + y = c$

B. $\log|xy| - x + y = c$

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

D. $\log|xy| - x - y = c$

Answer: C

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94. Solution of the differential equation $\frac{dy}{dx} = x^2y + y$ is

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

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

C. $\log|y| = \frac{1}{3}x^2 - x + c$

D. $\log|y| = \frac{1}{3}x^2 + x + c$

Answer: D

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95. Solution of the differential equation $\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$ is

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

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

C. $(\tan^{-1} x) + (\tan^{-1} y) = 0$

D. $\tan^{-1} y = c \tan^{-1} x = 0$

Answer: A

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96. The solution of the differential equation $(1-x^2)(1-y)dx = xy(1+y)dy$ is

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

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

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

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

Answer: A

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97. Find the general solution of each of the following differential equations:

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

A. $\log\left|\frac{x}{y}\right| = \frac{1}{x} + \frac{1}{y} + c$

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

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

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

Answer: A

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98. What is the solution of the differential equation

$$\frac{dy}{dx} = xy + x + y + 1 \, ?$$

A. $\log|1 + y| = x - x^2 + c$

B. $\log|1 + y| = x + x^2 + c$

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

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

Answer: C

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99. Solution of the differential equation $xy^3 \frac{dy}{dx} = 1 - x^2 + y^2 - x^2y^2$ is

A. $x^2 + y^2 + \log\left|x^2 + x^2y^2\right| = c$

B. $x^2 + y^2 - \log\left|x^2 + x^2y^2\right| = c$

C. $x^2 - y^2 + \log\left|x^2 + x^2y^2\right| = c$

D. $x^2 - y^2 - \log\left|x^2 + x^2y^2\right| = c$

Answer: B

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100. Solution of the differrential equation $\frac{dy}{dx} = x\sqrt{25 - x^2}$ is

A. $y - \left(25 - x^2\right)^{\frac{3}{2}} = c$

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

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

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

Answer: D

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101. If a an arbitrary constant, then solution of the differential equation $\frac{dy}{dx}+\sqrt{\frac{1-y^2}{1-x^2}}=0$ is

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

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

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

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

Answer: A

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102. Solution of the differential equation

A. $2y^2\tan^{-1}x-1=cy^2$

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

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

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

Answer: C

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103. The solution of the differential equation $y - x\frac{dy}{dx} = a\left(y^2 + \frac{dy}{dx}\right)$ is

A. (x+a)(1-ay)=cy

B. (x+a)(1+ay)=cy

C. x+a=cy(1-ay)

D. x+a=cy(1+ay)

Answer: A

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104. Solution of the differential equation $dr = a(r \sin \theta d\theta - \cos \theta dr)$ is

A. $r(1 + a \cos \theta) = c$

B. $r(1 + a \cos \theta) = ac$

C. $r(1 - a \cos \theta) = c$

D. $r(1 - a \cos \theta) = ac$

Answer: A

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105. Solution of the differential equation cos x cos y dy -sin x sin y dx=0 is

A. sin y cos x=c

B. sin y= c cosx

C. cos y sin x=c

D. cos y=c sinx

Answer: A

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106. The solution of the differential equation $\sec x dy - \text{cosec } y dx = 0$ is

A. sin x-cosy=x

B. sin x+cosy=c

C. sin x=c cos y

D. sin x cos y=c

Answer: B

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107. Solution of the differential equation $\tan y. \sec^2 x dx + \tan x. \sec^2 y dy = 0$ is

A. tan x tan y = c

B. tan x =c tan y

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

D. tan y = c tan x

Answer: A

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108. Solution of the differential equation $\sin x \dfrac{dy}{dx} + 1 + \sin x = 0$ is

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

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

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

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

Answer: A

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109. The general solution of the differential equation $\frac{dy}{dx}+\frac{1+\cos 2y}{1-\cos 2x}=0$ is given by

A. tan y+cot x=c

B. tan y-cot x=c

C. tan y cot x=c

D. cot y tan x=c

Answer: B

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110. Find the general solution of each of the following differential equations:

$\frac{1}{x}\cos^2 y dy+\frac{1}{y}\cos^2 x dx=0$

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

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

C.

D.

Answer: C

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111. Solution of the differential equation $\frac{dy}{dx} \tan y = \sin(x + y) + \sin(x - y)$ is

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

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

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

D. $\tan y - 2 \sec x = c$

Answer: A

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112. The general solution of the differential equation $\frac{dy}{dx}+\frac{\sin(x+y)}{2}=\frac{\sin(x-y)}{2}$ is (a) $(b)(c)\log\tan\left((d)(e)(f)\frac{y}{g}2(h)(i)(j)\right)=c-2\sin x(k)$ (l) (m) *[Math Processing Error]* (ee) (ff) *[Math Processing Error]* (uu) (vv) $(ww)(\times)\log\tan\left((yy)(zz)(aaa)\frac{y}{bbb}4(ccc)(ddd)+(eee)\frac{\pi}{fff}4(ggg)(hhh)$ (rrr)

A. $\log|\tan\left(\frac{y}{2}\right)=2\sin x$

B. $\log|\tan\left(\frac{y}{4}\right)=c-2\sin\left(\frac{x}{2}\right)$

C. $\log|\tan\left(\frac{y}{4}+\frac{\pi}{4}\right)=c-2\sin x$

D. $\log|\tan\left(\frac{y}{4}+\frac{\pi}{4}\right)=c-2\sin\left(\frac{x}{2}\right)$

Answer: B

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113. Solve the following differential equation:

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

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

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

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

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

Answer: C

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114. Solution of differential equation $\frac{dy}{dx} = 3^{x+y}$ is

A. $3^x - 3^{-y} = c$

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

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

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

Answer: B

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115. Solution of differential equation $e^{\frac{dy}{dx}} = x$ is

A. $x \log|x| - 1 - y = c$

B. $x \log|x| - 1 + y = c$

C. $x(\log|x| - 1) + y = c$

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

Answer: D

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116. $2x^{x+2y}dx - 3dy = 0$

A. $4e^{x} + 3e^{-2y} = c$

B. $4e^{x} - 3e^{-2y} = c$

C. $4e^{x} + 3e^{2y} = c$

D. $4e^{x} - 3e^{2y} = c$

Answer: A

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117. The solution of the differential equation $\frac{dy}{dx} = e^{3x-2y} + x^{2}e^{-2y}$,is

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

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

C. $\frac{e^{2y}}{2} = \frac{1}{3}\left(e^{3x-x3}\right) + c$

D. $\frac{e^{2y}}{2} = \frac{1}{3}\left(e^{3x+x3}\right) + c$

Answer: D

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118. Solution of differential equation $\log\left(\frac{dy}{dx}\right) = x + y$ is

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

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

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

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

Answer: B

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119. Solution of differential equation $\cos y \frac{dy}{dx} = e^{x + \sin y} + x^2 e^{\sin y}$ is

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

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

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

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

Answer: C

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

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

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

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

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

Answer: B

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121. Solution of differential equation $\frac{dy}{dx} = x \log x$ is

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

B. $y = \frac{x^2}{2}\log|x| - x^2 + c$

C. $y = \frac{x^2}{2} + \frac{x^2}{2}\log|x| + c$

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

Answer: D

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122. Solution of differential equation $\frac{dt}{dx} = \frac{x \log x}{t}$ is

A. $x = e^{-ct}$

B. $x = e^{ct}$

C. $\log|x| = e^{-ct}$

D. $\log|x| = e^{ct}$

Answer: B

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123. Solve the following differential equation : $x \cos y \, dy = (xe^x \log x + e^x) dx$

A. $x \sin y = e^x + xc$

B. $\sin y + e^x \log|x| + c = 0$

C. $\sin y - e^x \log|x| + c$

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

Answer: C

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124. Solution of differential equation $(x - y^2 x) dx - (y + x^2 y) dy = 0, \quad \text{if} \quad x = 2, y = 0,$ is

A. $(1 + x^2)(1 - y^2) = 4$

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

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

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

Answer: B

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125. Solution of differential equation $y-x\frac{dy}{dx}=y^2+\frac{dy}{dx}$, when x=1,y=2, is

A. (1+x)(1-y)+y=0

B. (1+x)(1-y)-y=0

C. (1+x)(1+y)+y=0

D. (1+x)(1+y)-y=0

Answer: A

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126. Solution of differential equation $\cos\frac{dy}{dx} = a, a \in R, y(0) = 2,$ is

A. $\sin\left(\frac{y+2}{x}\right) = a$

B. $\sin\left(\frac{y-2}{x}\right) = a$

C. $\cos\left(\frac{y+2}{x}\right) = a$

D. $\cos\left(\frac{y-2}{x}\right) = a$

Answer: D

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127. If $(2+\sin x)\frac{dy}{dx} + (y+1)\cos x = 0$ and $y(0) = 1,$ then $y\left(\frac{\pi}{2}\right)$ is equal to

A. 1

B. $\frac{1}{2}$

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

D. $\frac{1}{4}$

Answer: C

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128. The differential solution of the differetial $\frac{dy}{dx} = 3^{x+y}$, when x=y=0, is

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

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

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

D. $3^x - 3^{-y} = 2$

Answer: C

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129. The particular solution of the differential equation $\log\left(\frac{dy}{dx}\right) = x$, when x = 0 , y = 1 is .....

A. $y = e^x$

B. $y = -e^x$

C. $y = e^x + 2$

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

Answer: A

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130. Find the particular solution of the differential equation $\frac{\log(dy)}{dx} = 3x + 4y$ given that $y = 0$ when $x = 0$.

A. $4e^{3x} + 3e^{-4y} + 7 = 0$

B. $4e^{3x} + 3e^{-4y} - 7 = 0$

C. $4e^{3x} - 3e^{-4y} + 7 = 0$

D. $4e^{3x} - 3e^{-4y} + 7 = 0$

Answer: B

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131. The Particular solution of the differential equation $(x+1)\frac{dy}{dx} - 2e^{-y} = 1$ when x=1 , y=0

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

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

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

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

Answer: A

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132. $\frac{dy}{dx} = e^{2y}\cos x, \quad \text{when} \quad x = \frac{\pi}{6}, y = 0$

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

B. $e^{-2y} + 2\sin x = -2$

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

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

Answer: A

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133. $3e^x \tan y dx + (1 + e^x)\sec^2 dy = 0, \quad \text{when} x = 0 \text{ and } y = \pi$

A. $(1 + e^x)^3 \tan y = 0$

B. $(1 + e^x)^3 \tan y = 4$

C. $(1 + e^x)^3 \cot y = 0$

D. $(1 + e^x)^3 \cot y = 4$

Answer: A

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134. 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. $y=ex\log x$

B. ey =x log x

C. xy =e log x

D. y log x= ex

Answer: A

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135. The solution of the differential equation $e^{-x}(y+1)dy+\left(\cos^2 x-\sin 2x\right)y(dx)=0$ subjected to the condition that y = 1 when x = 0 is

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

B. $\log|y+1|+e^x\cos^2 x=1$

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

D. $\log|y+1| + e^x \cos^2 x = 2$

Answer: A

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136. For solving $\frac{dy}{dx} = 4x + y + 1$, suitable substitution is

A. y+4x+1=u

B. y=4x+u

C. y=4x

D. y=ux

Answer: A

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137. The solution of the differential equation $\frac{dy}{dx} = (4x + y + 1)^2$, is

A. 4x= y+1 =tan (2x+2c)

B. 4x + y+1 = cot (2x+2c)

C. 4x + y+1 = 2tan (2x+2c)

D. 4x + y+1 =2 cot (2x+2c)

Answer: C

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138. The solution of the differential equation

$(x + y)^2 \frac{dy}{dx} = a^2$ is

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

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

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

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

Answer: C

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139. Solution of the differential equation $(x-y)^2\left(\frac{dy}{dx}\right)=a^2$ is

A. $a\log\left|\frac{x-y-a}{x-y+a}\right|-y=c$

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

C. $\frac{a}{2}\log\left|\frac{x-y-a}{x-y+a}\right|+y=c$

D. $\frac{a}{2}\log\left|\frac{x-y-a}{x-y+a}\right|-y=c$

Answer: D

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140. Solution of the differential 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

D. tan(x+y)+sec(x+y)+x=c

Answer: A

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141. The solution of differential equation $y' = \cos(x+y)$ is :

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

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

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

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

Answer: A

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142. The solution of the differential equation $\frac{dy}{dx} = \sin(x+y) + \cos(x+y)$ is:

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

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

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

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

Answer: C

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143. Solution of the differential equation $1 + \frac{dy}{dx} + \cos ec(x+y) = 0$ is

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

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

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

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

Answer: D

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144. Solution of the differential equation $\cos^2(x-y)\frac{dy}{dx}=1$

A. y+tan(x-y)=c

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

C. y+cot(x-y)=c

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

Answer: D

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145. Solution of the differential equation $\sec^2(x-2y)\left(1-2\frac{dy}{dx}\right)=1$ is

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

B. tan(x-2y)-x=c

C. 2tan(x-2y)+x=c

D. 2tan(x-2y)-x=c

Answer: B

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146. Solution of the differential equation $x+y\frac{dy}{dx}=\sec\left(x^2+y^2\right)$ is

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

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

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

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

Answer: D

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147. Solution of the differential equation $\left(y+x\frac{dy}{dx}\right)\sin(xy)=\cos x$ is

A. sinx+cos(xy)=c

B. sinx-cos(xy)=c

C. cosx+sin(xy)=c

D. cosx-sin(xy)=c

Answer: A

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148. Solution of the differential equation $x\frac{dy}{dx}-y+x\sin\left(\frac{y}{x}\right)=0$ is

A. $x\left(1-\cos\left(\frac{y}{x}\right)\right)=c\sin\left(\frac{y}{x}\right)$

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

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

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

Answer: A

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

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

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

D. $x-\cos\left(\frac{y}{x}\right)=c$

Answer: A

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150. Solution of the differential equation $\left(x\frac{dy}{dx}-y\right)\sin\left(\frac{y}{x}\right)=x^2\cos x$ is

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

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

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

D. $\cos x-\sin\left(\frac{y}{x}\right)=c$

Answer: B

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151. The solution of the differential equation $\frac{dy}{dx}=\tan\left(\frac{y}{x}\right)+\frac{y}{x}$ is

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

B. $\sin\left(\frac{y}{x}\right)=cx$

C. $\cos\left(\frac{y}{x}\right)=cy$

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

Answer: B

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152. Show that the differential equation: $\left(x\frac{\cos y}{x}\right)(ydx + xdy) = \left(y\frac{\sin y}{x}\right)(xdy - ydx)$ is homogenous and solve it.

A. $\cos\left(\frac{y}{x}\right) = cxy$

B. $xy\cos\left(\frac{y}{x}\right) = c$

C. $x\cos\left(\frac{y}{x}\right) = cy$

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

Answer: B

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153. Solution of the differential equation

$$\left(2\sin\left(\frac{y}{x}\right)+2x\tan\left(\frac{y}{x}\right)-y\cos\left(\frac{y}{x}\right)-y\sec^2\left(\frac{y}{x}\right)\right)dx+\left(x\cos\left(\frac{y}{x}\right)+x\right.$$

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

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

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

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

Answer: C

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154. Solution of the differential equation $(x-y)\left(1-\frac{dy}{dx}\right)=e^x$ is

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

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

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

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

Answer: C

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155. Solve $\left(1+2e^{x/y}\right)dx+2e^{x/y}(1-x/y)dy=0.$

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

B. $x-2ye^{\frac{x}{y}}=c$

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

D. $x-2ye^{\frac{y}{x}}=c$

Answer: A

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156. Solution of the differential equation $\left(1+e^{\frac{x}{y}}\right)dx+e^{\frac{x}{y}}\left(1-\frac{x}{y}\right)dy=0$ is

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

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

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

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

Answer: C

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157. Solution of the differential equation $\left(x\frac{dy}{dx} - y\right)\sin\left(\frac{y}{x}\right) = x^2e^x$ is

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

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

C. $xe^x + \cos\left(\frac{y}{x}\right) = c$

D. $xe^x - \cos\left(\frac{y}{x}\right) = c$

Answer: A

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158. Solution of the differential equation $\left(x\frac{dy}{dx}-y\right)e^{\frac{y}{x}}=x^2\cos x$ is

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

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

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

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

Answer: A

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159. Solution of the differential equation $(x+y-1)dx+(2x+2y-3)dy=0$ is

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

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

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

D. $2y+2x+\log|x+y-2|=c$

Answer: C

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160. General solution of the differential equation $\frac{dy}{dx}=\frac{x+y+1}{x+y-1}$ is given by

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

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

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

D. $2y+2x+\log|x+y-2|=c$

Answer: D

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161. Solution of the differential equation $\frac{dy}{dx} = \frac{x+y+1}{x+y-1}, y = \frac{1}{3}, x = \frac{2}{3},$ is

A. $y + x + \frac{1}{3} = \log|x+y|$

B. $y - x + \frac{1}{3} = \log|x+y|$

C. $y + x - \frac{1}{3} = \log|x+y|$

D. $y - x - \frac{1}{3} = \log|x+y|$

Answer: B

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162. Solution of the differential equation $\frac{x+y-1}{x+y-2}\frac{dy}{dx} = \frac{x+y+1}{x+y+2}, x = 1, y = 1,$ is

A. $2(x+y) + \log\left|\frac{(x-y)^2+2}{2}\right| = 0$

B. $2(x+y) - \log\left|\frac{(x-y)^2+2}{2}\right| = 0$

C. $2(x-y) + \log\left|\frac{(x+y)^2-2}{2}\right| = 0$

D. $2(x-y)-\log\left|\frac{(x+y)^2-2}{2}\right|=0$

Answer: D

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163. Solution of the differential equation $(2x-2y+3)dx-(x-y+1)dy=0$, when y(0)=1 is

A. $2x-y+\log|x-y+2|+1=0$

B. $2x+y-\log|x-y+2|+1=0$

C. $2x-y-\log|x-y+2|+1=0$

D. $2x+y+\log|x-y+2|+1=0$

Answer: C

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164. Solution of the differential equation $\frac{xdy}{x^2+y^2} = \left(\frac{y}{x^2+y^2} - 1\right)dx$, is

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

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

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

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

Answer: B

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165. 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: (1) $-\frac{2}{5}$ (2) $-\frac{4}{5}$ (3) $\frac{2}{5}$ (4) $\frac{4}{5}$

A. $\frac{-2}{5}$

B. $\frac{-4}{5}$

C. $\frac{2}{5}$

D. $\frac{4}{5}$

Answer: D

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166. Solution of the differential equation $\frac{dy}{dx} = \frac{x-y}{x+y}$ 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: D

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167. Solution of the differential equation $\frac{dy}{dx} + \frac{x - 2y}{2x - y} = 0$ is

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

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

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

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

Answer: A

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168. Solution of the differential equation $(9x + 5y)dy + (15x + 11y)dx = 0$ is

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

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

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

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

Answer: A

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169. Solution of the differential equation $y^2dx+(xy+x^2)dy=0$ is

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

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

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

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

Answer: A

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170. Solution of the differential equation $(x^2-y^2)dx+2xydy=0$ is

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

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

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

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

Answer: B

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

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

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

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

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

Answer: A

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172. Show that the differential equation $2xy\frac{dy}{dx} = x^2 + 3y^2$ is homogeneousand solve it.

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

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

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

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

Answer: D

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

A. $\frac{x}{y} + \log|xy| = c$

B. $\frac{y}{x} + \log|xy| = c$

C. $\dfrac{x}{y} + \log|xy| = c$

D. $\dfrac{y}{x} + x\log|xy| = c$

Answer: A

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174. Solution of the differential equation $x^2\dfrac{dy}{dx} - 3xy - 2y^2 = 0$ is

A. y=cx(x-y)

B. y=cx(x+y)

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

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

Answer: D

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175. Solution of the differential equation $(x^2 - y^2)dx - 2xydy = 0$ is

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

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

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

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

Answer: A

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176. Solution of the differential equation $(x^2 + y^2)dy - xydx = 0$ is

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

B. $\log|y| = \frac{-x^2}{2y^2} + c$

C. $\log|y| = \frac{x^2}{y^2} + c$

D. $\log|y| = \frac{-x^2}{y^2} + c$

Answer: A

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177. Solution of the differential equation $\left(x^2 + 3xy + y^2\right)dx - x^2dy = 0$ is

A. $\dfrac{x+y}{x} - \log|x| = c$

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

C. $\dfrac{x}{x+y} - \log|x| = c$

D. $\dfrac{x}{x+y} + \log|x| = c$

Answer: D

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178. Solution of the differential equation $y^2 - x^2\dfrac{dy}{dx} = xy\dfrac{dy}{dx}$ is

A. $\frac{y}{x} - \log|y| = c$

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

C. $\frac{x}{y} - \log|y| = c$

D. $\frac{x}{y} + \log|y| = c$

Answer: B

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179. Solution of the differential equation $\frac{dy}{dx} = \frac{6x^2 - 5xy - 2y^2}{6x^2 - 8xy + y^2}$ is

A. $(y - 2x)^{12} = c(y - x)(y - 3x)^9$

B. $(y - 2x)^{12} = c(x - y)(y - 3x)^9$

C. $(y - 2x)^9 = c(y - x)(y - 3x)^{12}$

D. $(y - 2x)^9 = c(x - y)(y - 3x)^{12}$

Answer: A

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180. The solution of the differential equation $xy^2dy - (x^3 + y^3)dx = 0$ is

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

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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181. Solution of the differential equation $x^2ydx - (x^3 + y^3)dy = 0$ is

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

B. $\log|y| = \frac{-x^3}{3y^3} + c$

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

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

Answer: A

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182. Solution of the differential equation $x^2ydy + (x^3 + x^2y - 2xy^2 - y^3)dx = 0$ is

A. $\log\left|\frac{y+x}{x^4(y-x)}\right| = \frac{4x}{x+xy} + c$

B. $\log\left|\frac{y-x}{x^4(y+x)}\right| = \frac{4x}{x+xy} + c$

C. $\log\left|\frac{y+x}{x^4(y-x)}\right| = \frac{4x}{x+y} + c$

D. $\log\left|\frac{y-x}{x^4(y+x)}\right| = \frac{2x}{x+y} + c$

Answer: D

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183. Solution of the differential equation $\left(x\sqrt{x^2-y^2}-y^2\right)dx+xydy=0$ is

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

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

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

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

Answer: D

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184. Solution of the differential equation $x\dfrac{dy}{dx}=y+\sqrt{x^2+y^2}$, is

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

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

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

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

Answer: B

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185. Solution of the differential equation $\frac{dy}{dx}=\frac{y+\sqrt{x^2-y^2}}{x}$ is

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

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

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

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

Answer: C

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186. The solution of the differential equation $x+y\frac{dy}{dx}=2y$ is

A. 0

B. constant

C. ∞

D. 1

Answer: B

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187. The particular solution of the differential equation x dy+2y dx=0, then x=2, y=1 is

A. $x^2y = 4$

B. $x^2y = 2$

C. $x^2y = 1$

D. $x^2y = 0$

Answer: A

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188. Particular solution of the differential equation $xy\frac{dy}{dx} = x^2 + 2y^2, y(1) = 0,$ is

A. $x^2 + y^2 + x^4 = 0$

B. $x^2 - y^2 - x^4 = 0$

C. $x^2 + y^2 - x^4 = 0$

D. $x^2 - y^2 + x^4 = 0$

Answer: C

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189. Solution of the differential equation $(x^2 + 2y^2)dx - xydy = 0,$ when y (9)=0 is

A. $x^4 = -81(x^2 + y^2)$

B. $x^4 = 81(x^2 + y^2)$

C. $x^4 = -9(x^2 + y^2)$

D. $x^4 = 9(x^2 + y^2)$

Answer: B

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190. Show that the differential equation $2xy\frac{dy}{dx} = x^2 + 3y^2$ is homogeneousand solve it.

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

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

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

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

Answer: C

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191. Which of the following equation is non-linear?

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

B. $y\frac{dy}{dx} + 4x = 0$

C. dx+dy=0

D. $\frac{dy}{dx} = \cos x$

Answer: B

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192. If the integrating factor of the differential equation $\frac{dy}{dx} + P$ (x) y = Q (x) is x , then P (x) is

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193. The solution of $\frac{dy}{dx} + P(x)y = 0$, is

A. $y = ce^{\int pdx}$

B. $x = ce^{-\int pdx}$

C. $y = ce^{-\int pdx}$

D. $= ce^{-\int pdx}$

Answer: C

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194. Solution of the differential equation $\frac{dy}{dx} + \frac{y}{3} = 1$ is $y = 3 + ce\frac{-x}{3}$

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

B. $y = 3 + ce\frac{-x}{3}$

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

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

Answer: B

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195. Find the general solution of the differential equation $x\frac{dy}{dx} + 2y = x^2 (x \neq 0)$.

A. $y = \frac{x^2 + c}{4x^2}$

B. $y = \frac{x^2}{4} + c$

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

D. $y = \frac{x^4 + c}{4x^2}$

Answer: D

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196. Solution of the differential equation $(x + y)\frac{dy}{dx} = 1$ is

A. $x + y + 1 = ce^y$

B. $x + y - 1 = ce^y$

C. $x - y + 1 = ce^y$

D. $x - y - 1 = ce^{y}$

Answer: A

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197. The solution of the differential equation $\frac{dy}{dx} = \frac{1}{x + y^2}$ is

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

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

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

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

Answer: D

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198. Soluton of the kdifferential equaiton $(x + y)dy = a^2dx$ is

A. $x+y-a^2=ce^{\frac{y}{a2}}$

B. $x-y+a^2=ce^{\frac{y}{a2}}$

C. $x+y+a^2=ce^{\frac{y}{a2}}$

D. $x-y-a^2=ce^{\frac{y}{a2}}$

Answer: C

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199. Solution of the differential equation $(x+a)\frac{dy}{dx}-3y=(x+a)^5$ is

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

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

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

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

Answer: B

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200. Solution of the differential equation $\frac{dy}{dx} + \frac{1}{x}y = 3x$ is

A. x

B. log x

C. 0

D. ∞

Answer: A

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201. Solution of the differential equation $\frac{dy}{dx} + \frac{1}{x}y = x^3 - 3$ is

A. $xy = \frac{x^5}{5} - \frac{3x^2}{2} + c$

B. $xy = \frac{x^5}{5} + \frac{3x^2}{2} + c$

C. $xy = \frac{-x^5}{5} - \frac{3x^2}{2} + c$

D. $xy = \frac{-x^5}{5} + \frac{3x^2}{2} + c$

Answer: A

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202. The solution of the differential equation $\frac{(x + 2y^3)dy}{dx} = y$ is (a)
$(b)(c)(d)\frac{x}{e}\left((f)(g)y^{(h)2(i)}(j)\right)(k)(l) = y + c(m)$ (n) (b)
$(o)(p)(q)\frac{x}{r}y(s)(t) = (u)y^{(v)2(w)}(x) + c(y)$ (z) (c)
$(d)(e)(f)\frac{(g)(h)x^{(i)2(j)}(k)}{l}y(m)(n) = (o)y^{(p)2(q)}(r) + c(s)$ (t) (d)
$(u)(v)(w)\frac{y}{x}x(y)(z) = (aa)x^{(bb)2(cc)}(dd) + c(ee)$ (ff)

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

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

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

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

Answer: C

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203. Solution of the differential equation $ydx + (x - y^2)dy = 0$ is

A. $xy + y^3 = c$

B. $xy - y^3 = c$

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

D. $3xy - y^3 = c$

Answer: D

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204. Solution of the differential equatio $(1 - x^2)\frac{dy}{dx} + 2xy = x\sqrt{1 - x^2}$ is

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

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

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

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

Answer: A

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205. Solution of the differential equation $(1 + x)\frac{dy}{dx} - xy = 1 - x$ is

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

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

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

D. $xy + y - x = ce^{-x}$

Answer: B

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206. Intergrating factor of the differential equaiton $\left(x^2+1\right)\frac{dy}{dx}+2xy=x^2-1$ is

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

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

C. x^2+1

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

Answer: C

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

A. log x

B. x

C. x^e

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

Answer: B

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208. If an intergrating factor of the differential equation $(x - x^3)dy - (ax^3 + y - 2x^2y)dx = 0ise^{\int pdx}$, then p is

A. $\frac{2x^2 - 1}{x - x^3}$

B. $\frac{1 - 2x^2}{x - x^3}$

C. $\frac{ax}{x - x^3}$

D. $\frac{2x^2 - 1}{x - x^3}$

Answer: A

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

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

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

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

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

Answer: B

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210. IF $\sin x$ is the integerating factor (I.F) of the linear differential equation $\frac{dy}{dx}+py=Q$ then P is

A. log sin x

B. cos x

C. tan x

D. cos x

Answer: D

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211. Solution of the differential equation $\frac{dy}{dx}+y\cos x=0$ is

A. $2y=\cos x-\sin x+2ce^{-x}$

B. $2y=\cos+\sin x+2ce^{-x}$

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

D. $y=\cos x+\sin x+ce^{-x}$

Answer: B

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212. Solution of the differential equation $\cos^2 x\frac{dy}{dx}=y\tan x$ is

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

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

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

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

Answer: B

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213. Find the general solution of the following differential equations

$(i)\dfrac{dy}{dx}+y\sec x=\tan x$

$(ii)\dfrac{dy}{dx}+y\cot x=2\cos x$

A. $y=1+\dfrac{c+x}{\sec x+\tan x}$

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

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

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

Answer: B

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214. The integrating factor of linear differential equation $\frac{dy}{dx} + y \sec x = \tan x$ is

A. sec x-tan x

B. sec x tan x

C. sec x +tan x

D. sec x cot x

Answer: C

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215. Solution of the differential equation $x \sin x \frac{dy}{dx} + (x \cos x + \sin x)y = \sin x$ is

A. xy cos x -sin x =c

B. xy cos x +sin x = c

C. xy sin x - cos x = c

D. xy sin x + cos x = c

Answer: D

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216. Solution of the differential equation $dr + (2r\cot\theta + \sin 2\theta)d\theta = 0$ is

A. $r\sin^2\theta + \frac{\sin^4\theta}{4} = c$

B. $r\sin^2\theta - \frac{\sin^4\theta}{4} = c$

C. $r\sin^2\theta + \frac{\sin^4\theta}{2} = c$

D. $r\sin^2\theta - \frac{\sin^4\theta}{2} = c$

Answer: C

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217. If $\frac{dy}{dx} + 2y \tan x = \sin x$ and $y = 0$, when $x = \frac{\pi}{3}$, show that the maximum value of y is $\frac{1}{3}$

A. $y + \cos x + 2\cos^2 x = 0$

B. $y - \cos x - 2\cos^2 x = 0$

C. $y - \cos x + 2\cos^2 x = 0$

D. $y + \cos x - 2\cos^2 x = 0$

Answer: C

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218. If $\frac{dy}{dx} + 2y \tan x = \sin x$ and $y = 0$, when $x = \frac{\pi}{3}$, show that the maximum value of y is $\frac{1}{3}$

A. $\frac{1}{4}$

B. $\frac{1}{8}$

C. $\frac{1}{16}$

D. $\frac{3}{8}$

Answer: B

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219. The solution of the differential equation $\frac{dy}{dx} = \sec x - y \tan x$ is :

A. $e^{\tan x}$

B. $e^{\cos x}$

C. sec x +tan x

D. cosec x

Answer: C

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220. The solution of the differential equation $\frac{dy}{dx} = \sec x - y \tan x$ is :

A. y sec x = tan x+c

B. y sec x +tanx=c

C. sec x=y tanx+c

D. sec x +y tan x=c

Answer: A

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221. The solution of the differential equation

$\frac{dy}{dx} + \frac{3x^2}{1+x^3}y = \frac{\sin^2 x}{1+x^3}$, is

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

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

C. $y(1+x^3) = \frac{x}{2} - \frac{1}{4}\sin 2x + c$

D. $y(1+x^3) = \frac{x}{2} + \frac{1}{4}\sin 2x + c$

Answer: C

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222. Solve the differential equation $\text{dy=cos x(2-y cosec x)dx}$ given that $y = 2, \text{ when x}d = \frac{\pi}{2}$

A. y=sinx+cosx

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

C. $y = \frac{1}{\sqrt{2}}\sec\left(\frac{x}{2}\right) + \sqrt{2}\cos\left(\frac{x}{2}\right)$

D. y=sinx+cosx

Answer: A

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223. Solution of the differential equation $\frac{dy}{dx} + y\tan x = x^n \cos x$ is

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

B. $(n+1)y + x^{n-1}\cos x = c(n+1)\cos x$

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

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

Answer: C

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224. The solution of the differential equation

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

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

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

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

D. $x - \tan^{-1}y - 1ce^{-\tan^{-1}y}$

Answer: B

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225. Solution of the differential equation $x - \tan^{-1} y - 1ce^{-\tan^{-1} y}$ is

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

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

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

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

Answer: D

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226. The solution of the differential equation $x\frac{dy}{dx} = 2y + x^3e^x$, where y = 0 when x = 1 is

A. $y = x^3(e^x - e)$

B. $y = x^3(e - e^x)$

C. $y = x^2(e^x - e)$

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

Answer: C

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227. Integrating factor of the differential equation $(x.\log x)\frac{dy}{dx} + y = 2\log x$ is

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

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

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

D. $y = x\log|x| + c$

Answer: C

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228. 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. 2

B. 2e

C. e

D. 0

Answer: A

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229. An integrating factor of the differential equation $x\frac{dy}{dx} + y \log x = xe^x x^{\frac{-1}{2}\log x}, (x > 0)$, is

A. $x^{\log x}$

B. e^{x^2}

C. $(\sqrt{e})^{\log x}$

D. $\left(\sqrt{x}\right)^{\log x}$

Answer: D

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230. Solution of the differential equation $ydx - xdy + \log x dx = 0$ is

A. $y + \log|x| + 1 = cx$

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

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

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

Answer: A

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231. Solution of the differential equation $x\frac{dy}{dx} + 2y = x^2 \log x$ is

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

B. $x^2y - \frac{x^4}{16} + \frac{x^4}{4}\log|x| = c$

C. $x^2y + \frac{x^4}{16} - \frac{x^4}{4}\log|x| = c$

D. $x^2y - \frac{x^4}{16} - \frac{x^4}{4}\log|x| = c$

Answer: C

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232. An integrating factor of the differential equation

$y \log y \frac{dx}{dy} + x - \log y = 0$, is

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

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

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

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

Answer: D

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233. Find the equation of a curve passing through the origin given that the slope of the tangent to the curve at any point (x, y) is equal to the sum of the coordinates of the point.

A. $x+y+1=e^x$

B. $x+y-1=e^x$

C. $x-y+1=e^x$

D. $x-y-1=e^x$

Answer: A

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234. Find the equation of a curve passing through the point (0, 2) given that the sum of the coordinates of any point on the curve exceeds the magnitude of the slope of the tangent to the curve at that point by 5.

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

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

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

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

Answer: C

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235. Find the equation of a curve passing through the point (0, 1). If the slope of the tangent to the curve at any point (x, y) is equal to the sum of the x coordinate (abscissa) and the product of the x coordinate and y coordinate (ordinate) of t

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

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

C. $y-1=2e^{\frac{x^2}{2}}$

D. $y+1=2e^{\frac{x^2}{2}}$

Answer: D

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236. The slope of the tangent to the curve at any point is equal to y + 2x. Find the equation of the curve passing through the origin .

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

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

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

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

Answer: A

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237. Find the equation of the cure which passes through the origin and has the slope $x + 3y - 1$ at the point (x, y) on it.

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

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

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

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

Answer: B

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238. If the slope of tangent to the curve at every point on it is $\frac{-2xy}{x^2+1}$, then the equation of curve passing throgh the point (1,2) is

A. $x^2y+y+4=0$

B. $x^2y-y-4=0$

C. $x^2y-y+4=0$

D. $x^2y+y-4=0$

Answer: D

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239. The tangent at any point (x, y) of a curve makes an angle $\tan^{-1}(2x+3y)$ with x-axis. Find the equation of the curve if it passes through (1,2).

A. $6x-9y-2=26e^{3^{(x-1)}}$

B. $6x-9y+2=26e^{3^{(x-1)}}$

C. $6x+9y-2=26e^{3^{(x-1)}}$

D. $6x+9y+2=26e^{3^{(x-1)}}$

Answer: D

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240. An equation relating to stability of an aeroplane is $\frac{dv}{dt}=g\cos\alpha-kv$, where v is the velocity and g, k,α are constantts. If v=0. at t=0, velocity is

A. $\dfrac{g\cos\alpha}{k}\left(1-e^{-kt}\right)$

B. $\dfrac{-g\cos\alpha}{k}\left(1-e^{-kt}\right)$

C. $\dfrac{g\cos\alpha}{k}\left(1-e^{kt}\right)$

D. $\dfrac{-g\cos\alpha}{k}\left(1-e^{kt}\right)$

Answer: A

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241. The population of a city increases at a rate proportional to the population at that time. If the polultion of the city increase from 20 lakhs to 40 lakhs in 30 years, then after another 15 years, the polulation is

A. $10\sqrt{2}lakhs$

B. $20\sqrt{2}lakhs$

C. $30\sqrt{2}$

D. $40sqrqt2lakhs$

Answer: D

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242. The polulation of a city increases at a rate propotional to the population at that time. If the population of the city is doubled in 60 years, then population will be triplet in (log2=0.6912,log 3=1.0986)

A. 95.4 years

B. 95.3 years

C. 94.5 years

D. 95.5 years

Answer: A

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243. The rate of growth of a population is proportional to the number present if the population of a city doubled in the past 25 years, and the present population is 100000, when will the city have a population of 500000?

A. 60 years

B. 58 years

C. 48 years

D. 54 years

Answer: B

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244. The population of a town increases at a rate proportional to the population at that time . If the population increases from 40 thousands to 60 thousands in 40 years, What will be the population in another 20 years ? = [Given: $\sqrt{\frac{3}{2}} = 1.2247$]

A. $5\sqrt{6}$ thousands

B. $3\sqrt{6}$ thousands

C. $5\sqrt{3}$ thousands

D. $3\sqrt{3}$ thousands

Answer: B

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245. The population of a city increases at a rate proportional to the population at that time. If constant of proportionality is 0.04, then population of a city after 25 years, when initial polulation is 10,000 is (e=2.72)

A. 27200

B. 13600

C. 2720

D. 1360

Answer: A

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246. The population of a city increase at a rate proportional to the population at that time. In 40 years the population is increased from 30,000 to 40,000 then after time t, the population is

A. $(40000)\left(\frac{4}{3}\right)^{\frac{t}{40}}$

B. $(40000)\left(\frac{3}{4}\right)^{\frac{t}{40}}$

C. $(30000)\left(\frac{4}{3}\right)^{\frac{t}{40}}$

D. $(30000)\left(\frac{3}{4}\right)^{\frac{t}{40}}$

Answer: C

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247. 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. $400 - 300e^{\frac{t}{2}}$

B. $300 - 200e^{\frac{t}{2}}$

C. $600 - 500e^{\frac{t}{2}}$

D. $400 - 300e^{\frac{t}{2}}$

Answer: A

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248. The population grows in at the rate of 8% per year. Find the time taken for the population to become double . (Given : log 2 = 0.6912)

A. 12.98 years

B. 4.32 years

C. 17.28 years

D. 8.64 years

Answer: D

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249. The rate of increase in the number of bacteria in a certain becteria culture is propotional to the number present at that time. If initiallly there are 300 bacteria and after 2 hours, the bacteria polulation is increased by 20% then after 24 houre, the number of bacteria are $\left(\log 1.2 = 0.18232, e^{2.18784} = 8.9166\right)$

A. 2675

B. 2674

C. 3210

D. 3209

Answer: A

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250. The rate of increase in the number of bacterai in a certain becteria culture is propotional to the number present at that time. If is found that the number doubles in 4 hours, then at the end of 12 hours, the number of bacteria are

A. 4 times the original

B. 6 time the original

C. 8 times the original

D. 10 times the original

Answer: C

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251. The rate of increase in the number of bacteriad in a certain bacteria culture is propotional to the number present at that time. After 2 hours there are 600 becteria and after 8 hours the count is 75000, then the initial population is

A. 102

B. 120

C. 124

D. 142

Answer: B

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252. The rate of increase in the number of bacteria in a certain culture is propotional to the number present at that time. After 2 hours there are 600 bacteria and after 8 hours the count is 75000, then the population will be 200000 after

A. 9.21 hours

B. 9.12 hours

C. 9.22 hours

D. 9.23 hours

Answer: A

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253. Bacteria increases at the rate proportional to the number of bacteria present. If the original number N doubles in 3 hours, find in how many hours the number of bacteria will by 4N ?

A. 6 hours

B. 4 hours

C. 5 hours

D. 5.5 hours

Answer: A

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254. The rate o growth of bacteria is proportional to the number present . IT intially, there were 1000 bacteria and the number doubles in 1 hours. Find the number of bacteria after $2\frac{1}{2}$ hours . [take $\sqrt{2} = 1.414]$

A. 2828

B. 5656

C. 11312

D. 22624

Answer: B

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255. In a culture of yeast the active fernment doubles itself in 3 hours. If the quanitity increases at a rate proportional to itself, then in 15 hours, the amount will be. Times original amount.

A. 4

B. 8

C. 32

D. 16

Answer: C

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256. Bismath decomposes at a rate proportional to the quanitity of the substance present. If initial mass of substance is 800 mg. and its half life is of 5 days, then the mass of bismath after 30 days is

A. 12.5 mg

B. 25 mg

C. 6.25 mg

D. 18.75 mg

Answer: A

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257. The rate of decay of the mass of a radioactive substance at any time is 10^{-4} times its mass at that instant. After 10000 years, the mass will be

A. less than half of origina mass

B. double of original mass

C. tripe of original mass

D. square of original mass

Answer: A

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258. A radioactive substance decompose at a rate present. If initial amount of substance is 1.5 grams then the 0.5 grams of substance remains in. Days

A. k log 3

B. log 3

C. $\frac{1}{k}\log 3$

D. $\frac{1}{\log 3}$

Answer: C

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259. A radioactive substance decompose at a rate proportional to the quantity of the substance present. If intiallythe substance present is 100 mg and the half life of substance is 1590 years, then the substance reduces to 30 mg in $\log\left(\frac{10}{3}\right) = 1.2040, \log 2 = 0.6932$

A. 2761.62 years

B. 2761.63 years

C. 2767.62 years

D. 2767.63 years

Answer: B

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260. The rate of decay of certain substance is directly proportional to the amount present at that instant . Initially there are 27 gm of certain substance and three hours later it is found that 8 gm are left. Find the amount left after one more hour.

A. $\frac{2}{3}$ grams

B. $\frac{4}{3}$ grams

C. $\frac{8}{3}$ grams

D. $\frac{16}{3}$ grams

Answer: D

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261. If is given that radium decomposes at a rate proportional to the amount present. If $p\%$ of th original amount of radium disappears in l years, what percentageof it will remain after $2l$ years?

A. $\left(10-\frac{P}{10}\right)^2\%$

B. $\left(10+\frac{P}{10}\right)^2\%$

C. $\left(100-\frac{P}{100}\right)^2\%$

D. $\left(100+\frac{P}{100}\right)^2\%$

Answer: A

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262. The uranium disintegrates at a rate proportional to the amount present at any instant. If m_1 and m_2 gms of uranium are present at time t_1 and t_2 respectively, then half life of uranium is

A. $\dfrac{(t_1 - t_2)\log 2}{\log\left(\frac{m_1}{m_2}\right)}$

B. $\dfrac{(t_2 - t_1)\log 2}{\log\left(\frac{m_1}{m_2}\right)}$

C. $\dfrac{(t_1 - t_2)\log\left(\frac{m_1}{m_2}\right)}{\log 2}$

D. $\dfrac{(t_2 - t_1)\log\left(\frac{m_1}{m_2}\right)}{\log 2}$

Answer: B

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263. Water at $100^\circ C$ cools in 10 minutes to $88^\circ C$ in a room temperature of $25^\circ C$ .Find the temperature of water after 20 minutes.

A. $67^\circ C$

B. $68^\circ C$

C. $77^\circ C$

D. $78^\circ C$

Answer: D

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264. According to Newton's law of cooling, the body cools from $80^\circ C$ and $50^\circ C$ at room temperature of $25^\circ C$ in 30 minutes. After 1 hours, the temperature of the body is

A. $11.36^\circ C$

B. $18.18^\circ C$

C. $36.36^\circ C$

D. $22.72^\circ C$

Answer: C

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265. According to Newton's law of cooling, the body cools from $100^\circ C \rightarrow 60^\circ C$ in 20 minutes. The temperature of the surrounding being $20^\circ C$ The body cool down to $30^\circ C$ in

A. 40 minutes

B. 50 minutes

C. 90 minutes

D. 60 minutes

Answer: D

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266. According to Newton's law of cooling, the body cools from $110^\circ C$ to $60^\circ C$ at room temperature of $10^\circ C$ in 1 hour. The body cools to $30^\circ C$ after another

A. $\frac{\log 5}{\log 2} - 1$hours

B. $\frac{\log 5}{\log 2} + 1$hours

C. $\frac{\log 5}{\log 2}$hours

D. $\frac{\log 2}{\log 5}$hours

Answer: A

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267. According to Newton's law of cooling, the rate of cooling of a body in air is proportional to the difference between the temperature of the body and the temperature of the surrounding air. If the air temperature is $20^\circ C$ and the body cools for 20 minutes from $140^\circ C \to 80^\circ C$, then the temperature will be $50^\circ C$ in

A. 30 minutes

B. 40 minutes

C. 50 minutes

D. 60 minutes

Answer: B

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268. The doctor took the temperature of a dead body at 11.30 Pm which was $94.6^0 F$. He took the temperature of the body again after one hour, which was $93.4^0 F$. If the temperature of the room was $70^0 F$, estimate the time of death. Taking normal temperature of human body as $98.6^0 F$.

[Given: $\frac{\log(143)}{123} = 0.15066, \frac{\log(123)}{117} = 0.05$]

A. 8.30 a.m.

B. 8.30 p.m.

C. 2.30 a.m.

D. 9.30 p.m.

Answer: B

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269. A bullet is fired into a sand bag such that its retardation is assumed equal to the square root of its velocity on entering. If the velocity on entering the bag is 144 m/sec., then the time k requried for the bullet to travel is

A. 6 sec.

B. 12 sec.

C. 24 sec.

D. 48 sec.

Answer: C

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270. The surface area of a balloon being inflated, changes at a rate proportional to time t. If initially its radius is 1 unit and after 3 secons it is 2 units, find the radius after t seconds.

A. $\sqrt{\frac{t^2}{3}+1}$units

B. $\sqrt{\frac{t^2+1}{3}}$units

C. $\sqrt{t^2+1}$units

D. $\sqrt{t^2+3}$units

Answer: A

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271. Assume that a spherical rain drop evaporates at a rate proportional to its surfaceradius originally is 3 mm and 1 hour later has been reduced to 2 mm, find an expression for the radius of the rain drop at any time.

A. 2-t mm

B. 2+t mm

C. 3-t mm

D. 3+t mm

Answer: C

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272. Water is being poured into a vessel, in the form of an inverted right circular cone of semi-vertical angle 45°, in such a way that the rate of change of volume at any time is proportional to the area of the curved surface which is wet at that time. Intially, the vessel is full to a height to 2 cm and after 2 seconds, the height is 10 cm. After 3.5 seconds, the height is

A. 18 cm

B. 16 cm

C. 14 cm

D. 12 cm

Answer: B

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273. A right circular cone has height 9 cm and base radius is 5 cm. It is inverted and water is poured into it. If at any instant, the level of the water riese at the surface at that instant, then vessel will be full in

A. 25 seconds

B. 50 seconds

C. 75 seconds

D. 100 seconds

Answer: C

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274. Water flows from the base of rectangular tank of depth 16 mater. The rate of flowing the water is proportional to the square root of depth at any time t. If depth is 4 mater when t=2 hours then after 3 hours the depth is

A. 1 meter

B. 2 meters

C. 3 meters

D. 3.5 meters

Answer: A

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275. The rate of reduction of person's assets is proportional to square-root of his exising assets. In 2 years, his assets reduce from 25 lakhs to 6.25 lakhs, then the person will be bankrupt in another

A. 4 years

B. 3 years

C. 2 years

D. 1 years

Answer: C

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276. The particular solution of the differntial equation $xdy + 2ydx = 0$, when x=2 , y=1 is

A. $xy = 4$

B. $x^2y = 4$

C. $xy^2 = 4$

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

Answer: B

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277. If $(2 + \sin x)\frac{dy}{dx} + (y + 1)\cos x = 0$ and $y(0) = 1$, then $y\left(\frac{\pi}{2}\right)$ is equal to

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

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

C. $\frac{-2}{3}$

D. $\frac{-1}{3}$

Answer: B

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