MODEL PAPER - 7

MATHEMATICS

1. If $f(x) = \begin{vmatrix} \sin x + \sin 2x + \sin 3x & \sin 2x & \sin 3x \\ 3 + 4\sin x & 3 & 4\sin x \\ 1 + \sin x & \sin x & 1 \end{vmatrix}$, then the value of $\int_0^{\pi/2} f(x)\,dx$ is *(Integration)*

   1) 3 2) $\frac{2}{3}$ 3) $\frac{1}{3}$ 4) 0

2. Let the function $f : R \to R$ be defined by $f(x) = 2x + \sin x$, $x \in R$. Then f is *(Functions)*

   1) one - one and onto 2) one - one but not onto
   3) onto but not one - one 4) neither one - one nor onto

3. The incentre of the triangle with vertices $(1, \sqrt{3})$, $(0, 0)$ and $(2, 0)$ is *(Straight Lines)*

   1) $\left(1, \frac{\sqrt{3}}{2}\right)$ 2) $\left(1, \frac{1}{\sqrt{3}}\right)$ 3) $\left(\frac{2}{3}, \frac{1}{\sqrt{3}}\right)$ 4) $\left(\frac{2}{3}, \frac{\sqrt{3}}{2}\right)$

4. A hyperbola has the asymptotes $x + 2y = 3$ and $x - y = 0$ and passes through (2, 1), its centre is *(Hyperbola)*

   1) (1, 2) 2) (2, 2) 3) (2, 1) 4) (1, 1)

5. For $|x| < 1$, let $y = 1 + x + x^2 + \ldots\ldots\ldots\ldots\infty$, then $\frac{dy}{dx} - y =$ *(Differentiation)*

   1) $\frac{x}{y}$ 2) xy^2 3) $\frac{x}{y^2}$ 4) $\frac{x^2}{y^2}$

6. $\int (5 + \log \sin x)^2 \cdot \frac{\cos x}{\sin x} dx =$ *(Integration)*

   1) $\int (5 + \log \sin x)^3 + c$ 2) $\log \sin x + c$ 3) $\frac{1}{3}(5 + \log \sin x)^3 + c$ 4) $\frac{-1}{3}(5 + \log \sin x)^3 + c$

7. The area bounded by $y = \log x$, x-axis and the ordinates $x = 1$, $x = 2$ is (in sq. units) *(Areas)*

   1) $\frac{1}{2}(\log 2)^2$ 2) $\log\left(\frac{2}{e}\right)$ 3) $\log\left(\frac{4}{e}\right)$ 4) $\log 4$

8. The standard deviation of 3, 9, 11, 7, 5 is *(Measure of Dispersion)*

   1) $2\sqrt{2}$ 2) 2 3) $3\sqrt{2}$ 4) $2\sqrt{3}$

9. The equation whose roots are k times the roots of $x^4 + 2ax^3 + 4bx^2 + 8ax + 16 = 0$ is reciprocal equation, then k = *(Theory of Equations)*

   1) 2 2) 3 3) $\frac{1}{2}$ 4) $\frac{1}{3}$

10. If α, β, γ are the roots of the equation $x^3 - 10x^2 + 7x + 8 = 0$, then match the following : *(Theory of Equations)*

    1) $\alpha + \beta + \gamma$ a) - 43/4
    2) $\alpha^2 + \beta^2 + \gamma^2$ b) -7/8
    3) $\frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\gamma}$ c) 86
    4) $\frac{\alpha}{\beta\gamma} + \frac{\beta}{\gamma\alpha} + \frac{\gamma}{\alpha\beta}$ d) 0
    e) 10

    The correct match is
    1) 1-e, 2-c, 3-a, 4-b 2) 1-d, 2-c, 3-a, 4-b 3) 1-e, 2-c, 3-b, 4-a 4) 1-e, 2-b, 3-c, 4-a

11. If $z = \cos\alpha + i\sin\alpha$, then the amplitude of $z^2 + \bar{z}$ is *(Complex Numbers)*

    1) $\frac{\alpha}{2}$ 2) α 3) $\frac{3\alpha}{2}$ 4) 2α

12. If $|z_1 - 1| < 1$, $|z_2 - 2| < 2$, $|z_3 - 3| < 3$ then $|z_1 + z_2 + z_3| =$ *(Complex Numbers)*

    1) is less than 6 2) is less than 12 3) is less than 3 4) is less than 9

13. $\left(\frac{1 + i\sqrt{3}}{1 - i\sqrt{3}}\right)^6 + \left(\frac{1 - i\sqrt{3}}{1 + i\sqrt{3}}\right)^6 =$ *(De-Movier's Theorem)*

    1) -1 2) 0 3) 1 4) 2

14. Let α, β be the roots of the equation $(x - a)(x - b) = c$, $c \neq 0$. Then the roots of the equation $(x - \alpha)(x - \beta) + c = 0$ are

    1) a, c 2) b, c 3) a, b 4) a + b, b + c

15. The value of k, for which the equation $x^2 + 2(k + 1)x + k^2 = 0$ has equal roots, is *(Quadratic Expression)*

1) -1 2) $-\frac{1}{2}$ 3) 1 4) 2

16. If $R = \left(5\sqrt{5}+11\right)^{2n+1}$, f = R - [R] then Rf = *(Binomial Theorem)*

1) 1 2) 2^n 3) 2^{2n} 4) 4^{2n+1}

17. If $\frac{1}{(x-a)(x^2+b)} = \frac{A}{x-a} + \frac{Bx+C}{x^2+b}$ then B = *(Partial Fraction)*

1) $\frac{1}{a^2+b}$ 2) $\frac{-1}{a^2+b}$ 3) $\frac{1}{a+b^2}$ 4) $-\frac{1}{a+b^2}$

18. The letters of the word RANDOM are written in all possible ways and these words written out as in a dictionary then the rank of the word RANDOM is *(Permutation & Combination)*

1) 614 2) 615 3) 613 4) 616

19. The number of rectangles on a chess board is *(Permutation & Combination)*

1) 1225 2) 1296 3) 900 4) 1024

20. The number of natural numbers less than 1000 are divisible by 5 in which no digit occurs more than once in the same number is *(Permutation & Combination)*

1) 154 2) 136 3) 144 4) 152

21. If $P(A \cup B) = \frac{3}{4}$; $P(\bar{A}) = \frac{2}{3}$ then $P\left(\bar{A} \cap B\right) =$ *(Probability)*

1) $\frac{1}{12}$ 2) $\frac{7}{12}$ 3) $\frac{5}{12}$ 4) $\frac{11}{12}$

22. Seven chits are numbered 1 to 7. Four are drawn one by one with replacement. The probability that the least number on any selected chit is 5, is *(Probability)*

1) $1-\left(\frac{2}{7}\right)^4$ 2) $4\left(\frac{2}{7}\right)^4$ 3) $\left(\frac{3}{7}\right)^4-\left(\frac{2}{7}\right)^4$ 4) $\left(\frac{3}{7}\right)^4$

23. A bag contains four balls, two balls are drawn and found to be white. The probability that all the balls in bag are white is *(Probability)*

1) $\frac{2}{5}$ 2) $\frac{1}{5}$ 3) $\frac{4}{5}$ 4) $\frac{3}{5}$

24. A random variable X has the following distribution *(Random Variables)*

$X = x_i$:	1	2	3	4
$P(X - x_i)$:	k	2k	3k	4k

then k, P(x < 3)

1) $\frac{1}{10}, \frac{3}{5}$ 2) $\frac{1}{10}, \frac{3}{10}$ 3) $\frac{3}{10}, \frac{1}{10}$ 4) $\frac{1}{10}, \frac{5}{12}$

25. X is a Poisson variate such that P(X = 2) = $\frac{2}{3}$ P(X = 1) then P(X = 0) = *(Random Variables)*

1) $e^{-\frac{3}{4}}$ 2) $e^{-\frac{4}{3}}$ 3) $e^{-\frac{1}{3}}$ 4) $e^{\frac{1}{3}}$

26. The range of function $f(x) = 4^x + 2^x + 4^{-x} + 2^{-x} + 3$ is *(Functions)*

1) $\left[\frac{3}{4}, \infty\right)$ 2) $\left(\frac{3}{4}, \infty\right)$ 3) $(7, \infty)$ 4) $[7, \infty)$

27. If the sum to n terms of a series is $2^{n+1} + n - 2$ then n^{th} term = *(Mathematical Induction)*

1) $3^n - 1$ 2) $2^n + 1$ 3) $2^n - 1$ 4) $3^n + 1$

28. OABC is a parallelogram with $\overline{AB} = \bar{a}$ and $\overline{OB} = \bar{b}$ then $\overline{OA}$ = *(Vectors)*

1) $\bar{a}+\bar{b}$ 2) $\bar{a}-\bar{b}$ 3) $\bar{b}-\bar{a}$ 4) $\frac{1}{2}(\bar{a}-\bar{b})$

29. $\bar{a},\bar{b},\bar{c}$ are three non coplanar vectors such that $\bar{a}+\bar{b}+\bar{c}=\alpha\bar{d}$ and $\bar{b}+\bar{c}+\bar{d}=\beta\bar{a}$ then $\bar{a}+\bar{b}+\bar{c}+\bar{d}$ is equal to

1) $\bar{0}$ 2) $\alpha\bar{a}$ 3) $\beta\bar{b}$ 4) $(\alpha+\beta)\bar{c}$ *(Vectors)*

30. If the vectors $cx\bar{i} - 6\bar{j} + 3\bar{k}$, $x\bar{i} + 2\bar{j} + 2cx\bar{k}$ make an obtuse angle with each other for all real values for x then

1) $-\frac{4}{3} < c < 0$ 2) $0 < c \le \frac{4}{3}$ 3) $0 \le c \le 2$ 4) $c < 0$ ***(Vectors)***

31. The volume of a parallelopiped constructed on the diagonals of the faces of a given parallelopiped is m times, the volume of the given paralleopiped then m = ***(Vectors)***

1) 1 2) 2 3) 3 4) 4

32. **Assertion(A):** The points A, B, C and D with position vectors $4\bar{i}+5\bar{j}+\bar{k}$, $-\bar{j}-\bar{k}$, $3\bar{i}+9\bar{j}+4\bar{k}$ and $4\left(-\bar{i}+\bar{j}+\bar{k}\right)$ respectively are coplanar. ***(Vectors)***

Reason(R): The vectors $\overline{DA}$, $\overline{DB}$, $\overline{DC}$ are linearly independent.

Which of the following is true?

The true statements are:

1) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**

2) Both **(A)** and **(R)** are true and **(R)** is not the correct explanation of **(A)**

3) **(A)** is true and **(R)** is false 4) **(A)** is false and **(R)** is true

33. Let $\bar{a}, \bar{b}, \bar{c}$ be mutually perpendicular unit vectors ***(Vectors)***

Statement I : $\left|\bar{a}+\bar{b}+\bar{c}\right| = \sqrt{3}$

Statement II : $\bar{a}+\bar{b}+\bar{c}$ is equally inclined to $\bar{a}, \bar{b}, \bar{c}$.

1) I and II are true 2) I and II are false 3) I is false and II is true 4) I is true and II is false

34. If A = $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and B = λA = $\begin{bmatrix} a & b \\ c & a+b+c \end{bmatrix}$ then ***(Matrices)***

1) B is a null matrix 2) B = A 3) B is an identity matrix 4) B = 2A

35. $\begin{vmatrix} a+b & c & b+c \\ a-b & c & 3b+c \\ b+c & c & a+b \end{vmatrix}$ is equal to ***(Matrices)***

1) a + 2b +2c 2) 0 3) a + 2b + c 4) 2(a + b + c)

36. The element in the first row and third column of the inverse of the matrix $\begin{bmatrix} 1 & 2 & -3 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{bmatrix}$ is ***(Matrices)***

1) - 2 2) 0 3) 1 4) 7

37. The system of equations x + y + z = 6, x + 2y + λz = 0, x + 2y + 3z = 10 has no solution, then ***(Matrices)***

1) λ = 3 2) λ = 5 3) λ = - 5 4) λ = 6

38. If cosec A + cot A = $\frac{11}{2}$, then tan A is ***(Trignometry)***

1) $\frac{21}{22}$ 2) $\frac{15}{16}$ 3) $\frac{44}{117}$ 4) $\frac{117}{44}$

39. If $\sin x + \cos x = \frac{1}{5}$, $0 \le x \le \pi$, then tan x is equal to ***(Trignometry)***

1) $\frac{4}{3}$ 2) $-\frac{4}{3}$ or $-\frac{3}{4}$ 3) $\frac{4}{5}$ 4) $\frac{8}{15}$

40. If sin θ is the geometric mean between sinϕ and cosϕ, then cos 2θ is equal to ***(Trignometry)***

1) $2\sin^2\left(\frac{\pi}{4}-\phi\right)$ 2) $2\cos^2\left(\frac{\pi}{4}-\phi\right)$ 3) $2\cos\left(\frac{\pi}{4}+\phi\right)$ 4) $2\sin^2\left(\frac{\pi}{4}+\phi\right)$

41. The period of f(x) = $\sin^2\left(\frac{\pi}{8}+\frac{x}{2}\right)-\sin^2\left(\frac{\pi}{8}-\frac{x}{2}\right)$ is ***(Trignometry)***

1) $\frac{\pi}{4}$ 2) π 3) $\frac{\pi}{2}$ 4) 2π

42. If $\tan\left(\frac{\pi}{4}+\theta\right)+\tan\left(\frac{\pi}{4}-\theta\right)=4$, then θ = ***(Trignometry Equations)***

1) $n\pi \pm \frac{\pi}{3}$ 2) $n\pi \pm \frac{\pi}{6}$ 3) $n\pi \pm \frac{\pi}{4}$ 4) $n\pi \pm \frac{\pi}{5}$

43. If $\mathrm{Tan}^{-1}\frac{x+1}{x-1} + \mathrm{Tan}^{-1}\frac{x-1}{x} = \mathrm{Tan}^{-1}(-7)$, then x = *(Inverse Trignometry)*
1) 1 2) 2 3) no solution 4) -2

44. If $2\sinh^{-1}\left(\frac{a}{\sqrt{1-a^2}}\right) = \log\left(\frac{1+x}{1-x}\right)$ then x = *(Hyperbola)*
1) a 2) - a 3) $\frac{1+a}{1-a}$ 4) $\frac{1-a}{1+a}$

45. If in a triangle ABC, $\frac{b+c}{11} = \frac{c+a}{12} = \frac{a+b}{13}$, then cos A is equal to *(Properties of Triangle)*
1) $\frac{1}{5}$ 2) $\frac{5}{7}$ 3) $\frac{19}{35}$ 4) $\frac{13}{35}$

46. If p_1, p_2, p_3 are respectively the perpendiculars from the vertices of a triangle to the opposite sides, then $p_1 p_2 p_3$ = *(Properties of Triangle)*
1) $\frac{a^2b^2c^2}{R^3}$ 2) $\frac{a^2b^2c^2}{4R^3}$ 3) $\frac{4a^2b^2c^2}{R^3}$ 4) $\frac{a^2b^2c^2}{8R^3}$

47. In an obtuse angled traingle, circumcentre lies *(Properties of Triangle)*
1) inside the triangle 2) outside the triangle 3) lies on one side 4) it cannot be decided

48. If A = (4, 0), B=(-4, 0) are the two points and |AP - PB| = 4, then the locus of P is *(Locus)*
1) $3x^2 - y^2 = 12$ 2) $x^2 - 3y^2 = 1$ 3) $3x^2 + y^2 = 12$ 4) $x^2 + 3y^2 = 12$

49. The transformed equation of $4x^2 + 9y^2 - 8x + 36y + 4 = 0$ when the axes are translated to (1, -2) is $aX^2 + bY^2 = c$. Then descending order of a, b, c is *(Transformation of Axes)*
1) c, b, a 2) c, a, b 3) a, b, c 4) a, c, b

50. The equation of the altitude from A to BC of the triangle with vertices A(0, 1), B(2, 0), C(2, -2) is *(Straight Lines)*
1) x - 1 = 0 2) x + y -1 = 0 3) y - 1 = 0 4) y = 0

51. A straight line passes through the fixed point $\left(\frac{1}{k}, \frac{1}{k}\right)$. The sum of the reciprocals of its intercepts on the coordinate axes is *(Straight Lines)*
1) $\frac{2}{k}$ 2) $\frac{k}{2}$ 3) 2k 4) k

52. The equation to the pair of lines through the origin and forming an equilateral triangle with the line 2x + 3y + 5 = 0 is *(Pair of Straight Lines)*
1) $23x^2 - 48xy + 3y^2 = 0$ 2) $23x^2 + 48xy - 3y^2 = 0$ 3) $23x^2 + 48xy + 3y^2 = 0$ 4) $23x^2 - 48xy - 3y^2 = 0$

53. The length of the intercept on the x-axis cut by the pair of lines $2x^2 + 5xy + 3y^2 + 6x + 7y + 1 = 0$ is *(Pair of Straight Lines)*
1) $\sqrt{7}$ 2) $2\sqrt{7}$ 3) $\frac{\sqrt{7}}{2}$ 4) $\sqrt{2}$

54. A, B, C are the projections of P(5, -2, 6) on the coordinate planes then the centroid of the ΔABC is *(3D)*
1) (5, -2, 6) 2) $\left(\frac{5}{3}, -\frac{2}{3}, 2\right)$ 3) $\left(\frac{20}{3}, -\frac{8}{3}, 8\right)$ 4) $\left(\frac{10}{3}, -\frac{4}{3}, 4\right)$

55. A = (-2, 3, 4), B = (-4, 4, 6), C = (4, 3, 5), D = (0, 1, 2) then the projection of $\overline{AB}$ on $\overline{CD}$ is *(3D)*
1) $\frac{1}{\sqrt{29}}$ 2) $\frac{3}{\sqrt{29}}$ 3) $\frac{16}{\sqrt{29}}$ 4) 0

56. The equation of the plane passing through (1, -2, 4), (3, -4, 5) and perpendicular to yz - plane is *(Plane)*
1) 2y + z = 0 2) y + 2z + 6 = 0 3) y + 2z - 6 = 0 4) 3y + 2z - 2 = 0

57. The equation of the circle of radius 5 with centre on X-axis and passing through the point (2, 3) is *(Circles)*
1) $x^2 + y^2 - 12x - 11 = 0$ 2) $x^2 + y^2 + 4x - 21 = 0$ 3) $x^2 + y^2 + 12x + 11 = 0$ 4) $x^2 + y^2 - 4x + 21 = 0$

58. If the two circles $x^2 + y^2 = 4$ and $x^2 + y^2 - 24x - 10y + a^2 = 0$, $a \in I$, have eactly two common tangents, then the number of possible values of 'a' is
(Circles)
1) 11 2) 13 3) 0 4) 2

59. The locus of centre of a circle which passes through the origin and cuts off a length of 4 units from the line x = 3 is
(Circles)
1) $y^2 + 6x = 13$ 2) $y^2 + 6x = 0$ 3) $y^2 - 6x = 13$ 4) $x^2 + 6y = 13$

60. Circle $x^2 + y^2 + 2ax + 2by + k = 0$ bisects the circumference of $x^2 + y^2 + 2gx + 2fy + c = 0$ then length of common chord *(System of Circles)*
1) $\sqrt{g^2+f^2-c}$ 2) $2\sqrt{a^2+b^2-k}$ 3) $2\sqrt{g^2+f^2}$ 4) $2\sqrt{g^2+f^2-c}$

61. For the parabola $y^2 + 8x - 12y + 20 = 0$ *(Parabola)*
1) vertex is (2, 6) 2) focus is (0, 6) 3) latusrectum is 4 4) axis is y = 6

62. The sum of the distances of a point (2, -3) from the foci of an ellipse $16(x - 2)^2 + 25(y+ 3)^2 = 400$ is *(Ellipse)*
1) 8 2) 6 3) 50 4) 10

63. Length of the latus rectum of the hyperbola $2x^2 - y^2 - 4x - 4y - 20 = 0$. *(Hyperbola)*
1) 4 2) 12 3) 7 4) 3

64. $\underset{x\to 0}{Lt}\dfrac{x.2^x - x}{1-\cos x}$ is equal to *(Limits)*
1) 2 log 2 2) log 2 3) $\frac{1}{2}$ log 2 3) $\frac{1}{2}$

65. If $\underset{x\to 0}{Lt}\dfrac{\log(3+x)-\log(3-x)}{x}=k$, the value of k is *(Limits)*
1) 0 2) $-\frac{1}{3}$ 3) $\frac{2}{3}$ 4) $-\frac{2}{3}$

66. If α is a repeated root of $ax^2 + bx + c = 0$, then $\underset{x\to\alpha}{Lt}\dfrac{\tan(ax^2+bx+c)}{(x-\alpha)^2}$ is *(Limits)*
1) a 2) b 3) c 4) 0

67. If f(x) = $\begin{cases}\dfrac{x^2-(a+2)x+a}{x-2}, & x\neq 2\\ 2, & x=2\end{cases}$ is continuous at x = 2, then the value of a is *(Continuity)*
1) - 6 2) 0 3) 1 4) -1

68. Let f(x+y) = f(x) f(y) for all x and y. Suppose that f(3) = 3 and $f'(0)$ = 11, then $f'(3)$ is equal to *(Differentiation)*
1) 22 2) 33 3) 28 4) 30

69. The ratio of relative errors of y and x with respect to the given function $y = x^n$ is *(Errors)*
1) 1 : n 2) n : 1 3) 1 : 1 4) 2 : 1

70. A variable triangle is inscribed in a circle of radius R. If the rate of change of a side is R times the rate of change of the opposite angle then that angle is *(Rate of Change)*
1) $\pi/2$ 2) $\pi/4$ 3) $\pi/6$ 4) $\pi/3$

71. The point of the curve $y^3 + 3x^2 = 12y$. Where the tangent is vertical is *(Tangents & Normals)*
1) (0, 0) 2) $\left(\frac{4}{\sqrt{3}},1\right)$ 3) $\left(\frac{4}{\sqrt{3}},2\right)$ 4) $\left(\frac{4}{\sqrt{3}},\frac{11}{\sqrt{3}}\right)$

72. Rolle's theorem is applicable in the interval [-2, 2] for the function *(Mean Value Theorem)*
1) $f(x) = x^3$ 2) $f(x) = 4x^4$ 3) $f(x) = 2x^3 + 3$ 4) $f(x) = \pi|x|$

73. The ratio of two parts of a number 'a' such that the product of 5th power of one and 6th power of the other is maximum is *(Maxima & Minima)*
1) 25 : 36 2) 6 : 11 3) 5 : 11 4) 5 : 6

74. $\int\dfrac{\cot x}{\sqrt{\sin x}}dx$ is equal to *(Integration)*
1) $2\sqrt{\sin x}+c$ 2) $\dfrac{1}{2\sqrt{\sin x}}+c$ 3) $\dfrac{-2}{\sqrt{\sin x}}+c$ 4) $\dfrac{2}{\sqrt{\sin x}}+c$

75. $\int_0^{\frac{\pi}{2}}\left(2\,\mathrm{Tan}\frac{x}{2}+x\sec^2\frac{x}{2}\right)dx =$ *(Definite Integrals)*
1) π 2) $\pi/2$ 3) $2\pi/3$ 4) $\pi/6$

76. $a_n = \int_{\pi/4}^{\pi/2}\cot^n x\,dx$, then $a_2 + a_4$, $a_3 + a_5$, $a_4 + a_6$ are in *(Definite Integrals)*
1) GP 2) AP 3) HP 4) AGP

77. $\underset{n\to\infty}{Lt}\left[\dfrac{\sqrt{n^2-1^2}}{n^2}+\dfrac{\sqrt{n^2-2^2}}{n^2}+\dfrac{\sqrt{n^2-3^2}}{n^2}+\text{.......n terms}\right]$ *(Definite Integrals)*
1) $\frac{\pi}{4}$ 2) $\frac{\pi}{2}$ 3) $\frac{\pi}{3}$ 4) $\frac{\pi}{6}$

78. The differential equation of family of parabolas with foci at the origin and axis along the x-axis is *(Differentiation Equatons)*

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

79. Soltuion of the differential equation $x\sin\frac{y}{x}dy = \left(y\sin\frac{y}{x} - x\right)dx$ is *(Differentiation Equatons)*

1) $\log x = \cos\left(\frac{y}{x}\right) + C$
2) $\log y = \cos\left(\frac{x}{y}\right) + C$
3) $\log x = \cos\left(\frac{x}{y}\right) + C$
4) $\log y = \cos\left(\frac{y}{x}\right) + C$

80. The solution of $(x^2 - y^2)\,dx + 2xy\,dy = 0$ is *(Differentiation Equatons)*

1) $x^2 - y^2 = cx$
2) $x^2 + y^2 = cy$
3) $x^2 + y^2 = cx$
4) $x^2 - y^2 = cy$