

Bihar Board Class 10th Mathematics-822-Set A - 2023 Question Paper

Time Allowed :3 Hour 15 minutes	Maximum Marks :100	Total Questions :138
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General Instructions

Read the following instructions very carefully and strictly follow them:

1. Candidate must enter his/her **Question Booklet Serial No. (10 Digits)** in the **OMR Answer Sheet**.
2. Question Nos. 1 to 100 have four options, out of which only one is correct.
Answer any 50 questions. You have to mark your selected option on the OMR Answer Sheet.

1. $\frac{d}{dx}(\sec^2 x - \tan^2 x) =$

- (1) $2\sec^2 x - 2\tan x$
- (2) $2\sec(x) - 2\tan x$
- (3) 1
- (4) 0

2. $\frac{d}{dx}[e^2 + 2ex] =$

- (1) $2e + 2x$
- (2) $4e$
- (3) $2e$
- (4) $2x$

3. $\frac{d}{dx} \left[\lim_{x \rightarrow a} \frac{x^n + a^n}{x + a} \right] =$

- (1) $\frac{a^n}{a}$
- (2) $\frac{2a^n}{a}$
- (3) 1
- (4) 0

4. $\frac{d}{dx}(\sin^{-1}(2x)) =$

- (1) $\frac{1}{\sqrt{1-4x^2}}$
 - (2) $\frac{2}{\sqrt{1-x^2}}$
 - (3) $\frac{2}{\sqrt{1-4x^2}}$
 - (4) $\frac{\pi}{2} - \cos^{-1}(2x)$
-

5. $\frac{d}{dx} \left[\frac{(x+2)(x^2-2x+4)}{x^3+8} \right] =$

- (1) $\frac{2x-2}{3x^2}$
 - (2) $\frac{(x^2-2x+4)+(2x-2)}{3x^2}$
 - (3) 1
 - (4) 0
-

6. $\frac{d}{dx} [2\sqrt{x}] =$

- (1) $\frac{2}{\sqrt{x}}$
 - (2) $\frac{1}{2\sqrt{x}}$
 - (3) $\frac{1}{\sqrt{x}}$
 - (4) $-\frac{1}{\sqrt{x}}$
-

7. $\frac{d}{dx} [(1 - \cos 2x) + 2 \cos^2 x] =$

- (1) $-4 \sin x \cos x$
 - (2) 1
 - (3) 0
 - (4) 2
-

8. $\frac{d}{dx} [\log(x^2) + \log(a^2)] =$

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

9. $\frac{d}{dx} [2 \tan^{-1}(x)] =$

- (1) $\frac{1}{1+x^2}$
- (2) $\frac{1}{1+4x^2}$
- (3) $\frac{2}{1+4x^2}$
- (4) $\frac{2}{1+x^2}$

10. $\frac{d}{dx} [e^{x^2}] =$

- (1) e^{x^2}
- (2) e^{2x}
- (3) $2x \cdot e^{x^2}$
- (4) $2x \cdot e^{2x}$

11. $\int \frac{dx}{x^2+4}$

- (1) $\frac{1}{4} \tan^{-1} \left(\frac{x}{4} \right) + k$
- (2) $\frac{1}{2} \tan^{-1} \left(\frac{x}{2} \right) + k$
- (3) $\frac{1}{2} \tan^{-1} \left(\frac{2}{x} \right) + k$
- (4) $2 \tan^{-1} \left(\frac{x}{2} \right) + k$

12. $\int \frac{\cos 2x}{\cos x + \sin x} dx$

- (1) $\sin x - \cos x + k$
- (2) $-\sin x - \cos x + k$
- (3) $\sin x + \cos x + k$
- (4) $-\sin x + \cos x + k$

13. $\frac{d}{dx} [\cos(\pi x + \sin \pi)]$

- (1) $-\sin(\pi x + \sin \pi)$
- (2) $-\pi \sin(\pi x)$

- (3) $-\sin \pi x$
(4) $\sin x$
-

14. $\int \tan(\tan^{-1}(x)) dx$

- (1) $\frac{x^2}{2} + k$
(2) $\frac{x}{2} + k$
(3) $x + k$
(4) $\log(\sec(\tan^{-1}(x))) + k$
-

15. $\int \frac{1}{e^{-x}} dx$

- (1) $-\frac{1}{e^{-x}} + k$
(2) $e^x + k$
(3) $\frac{1}{e^{-x}} \cdot \frac{1}{x^2} + k$
(4) $-e^{-x} + k$
-

16. $\int \log(x^2) dx$

- (1) $\frac{1}{x^2} + k$
(2) $\frac{2}{x} + k$
(3) $x \log(x) - x + k$
(4) $2(x \log(x) - x) + k$
-

17. $\int (\sin 3x + 4 \sin^3 x) dx$

- (1) $3 \sin x + k$
(2) $-3 \cos x + k$
(3) $\frac{\cos 3x}{3} + 12 \sin^2 x + k$
(4) $\frac{\cos 3x}{3} + 4 \cos^3 x + k$
-

18. $\int_{-1}^1 \sin^7 x \cos^{13} x dx$

- (1) 0
- (2) 1
- (3) 20
- (4) 6

19. $\int_0^1 \frac{4 \tan^{-1}(x)}{1+x^2} dx$

- (1) $\frac{\pi^2}{4}$
- (2) $\frac{\pi^2}{8}$
- (3) $\frac{\pi}{4}$
- (4) $\frac{\pi}{8}$

20. $\int_0^1 3x^2 dx$

- (1) 3
- (2) $\frac{1}{3}$
- (3) 1
- (4) $\frac{1}{9}$

21. $\int_0^a x \cdot \frac{1}{2\sqrt{a^2-x^2}} dx$

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

22. $\int_0^a \frac{1}{\sqrt{x}} dx$

- (1) $2\sqrt{x}$
- (2) $2\sqrt{a}$
- (3) $\sqrt{x}$
- (4) $\sqrt{a}$

23. $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\cos x}}{\sqrt{\sin x} + \sqrt{\cos x}} dx$

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

24. $\int_0^{\frac{\pi}{2}} \log(\tan x) dx$

- (1) $\frac{\pi}{4}$
- (2) $\frac{\pi}{2}$
- (3) 0
- (4) π

25. $\int_0^1 e^x dx$

- (1) e
- (2) $1 - e$
- (3) $e - 1$
- (4) 0

26. $\int_0^{\frac{\pi}{2}} \sin x \cos x dx$

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

27. $\int_0^1 (x + 2x + 3x^2 + 4x^3) dx$

- (1) 10
- (2) $\frac{5}{2}$
- (3) $\frac{7}{2}$

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

28. $\int_{-1}^1 \sin x \cos^3 x \, dx$

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

29. $100 \int_0^1 x^{99} \, dx =$

- (1) 100
 - (2) $\frac{1}{100}$
 - (3) 1
 - (4) 101
-

30. $2 \int_1^9 \frac{dx}{\sqrt{x}}$

- (1) 8
 - (2) 4
 - (3) 2
 - (4) 12
-

31. $\int \frac{1}{x \log(x)} \, dx$

- (1) $\log(x) + k$
 - (2) $(\log(x))^2 + k$
 - (3) $\log(\log(x)) + k$
 - (4) $\frac{1}{\log(x)} + k$
-

32. $\int \frac{x-3}{x^2-9} \, dx$

- (1) $\log(x - 3) + k$
 - (2) $\log(x + 3) + k$
 - (3) $-\frac{1}{(x+3)^2} + k$
 - (4) $\frac{x^2}{2} - 3x + k$
-

33. If $n(A) = 4$ and $n(B) = 2$, then $n(A \times B) =$

- (1) 6
 - (2) 8
 - (3) 16
 - (4) none of these
-

34. If operation 'o' is defined as $(a \circ b) = a^3 + b^3$, then $4 \circ (1 \circ 2) =$

- (1) 729
 - (2) 793
 - (3) 783
 - (4) 792
-

35. $f : A \rightarrow B$ will be an onto function if

- (1) $f(A) \subset B$
 - (2) $f(A) = B$
 - (3) $f(A) \supset B$
 - (4) $f(A) \neq B$
-

36. If $f : \mathbb{R} \rightarrow \mathbb{R}$ such that $f(x) = 3x - 4$, then which of the following is $f^{-1}(x)$?

- (1) $\frac{1}{3}(x + 4)$
 - (2) $\frac{1}{3}x - 4$
 - (3) $3x - 4$
 - (4) Undefined
-

37. If operation 'o' is defined as $(a \circ b) = a^2 + b^2 - ab$, then $(1 \circ 2) \circ 3 =$

- (1) 18
 - (2) 27
 - (3) 9
 - (4) 12
-

38. Let $A = \{1, 2, 3, \dots, n\}$. How many bijective functions $f : A \rightarrow A$ can be defined?

- (1) n
 - (2) $|n|$
 - (3) $\frac{1}{2}|n|$
 - (4) $|n - 1|$
-

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

- (1) 1
 - (2) $\sqrt{3}$
 - (3) 0
 - (4) infinite
-

40. $\cos^{-1}(x) + \sec^{-1}\left(\frac{1}{x}\right) =$

- (1) $\frac{\pi}{2}$
 - (2) $\cos^{-1}(2x^2 - 1)$
 - (3) $\cos^{-1}(1 - 2x^2)$
 - (4) $\cos^{-1}(2x)$
-

41. Find $\cot^{-1}\left(\tan\left(\frac{\pi}{7}\right)\right)$

- (1) $\frac{\pi}{7}$
- (2) $\frac{5\pi}{14}$
- (3) $\frac{9\pi}{14}$
- (4) $\frac{3\pi}{14}$

42. Find $\cos^{-1}\left(\cos\left(\frac{8\pi}{5}\right)\right)$

- (1) $\frac{8\pi}{5}$
- (2) $\frac{2\pi}{5}$
- (3) $\frac{\pi}{5}$
- (4) $\frac{3\pi}{5}$

43. Find $\tan^{-1}(-\sqrt{3})$

- (1) $\frac{\pi}{6}$
- (2) $\frac{\pi}{3}$
- (3) $\frac{2\pi}{3}$
- (4) $-\frac{\pi}{3}$

44. Find $\tan^{-1}(\sqrt{3}) - \cot^{-1}(-\sqrt{3})$

- (1) 0
- (2) $-\frac{\pi}{2}$
- (3) π
- (4) $\frac{\pi}{2}$

45. Find $\sin\left(\sin^{-1}\left(\frac{2\pi}{3}\right)\right) + \tan^{-1}\left(\tan\left(\frac{3\pi}{4}\right)\right)$

- (1) $\frac{17\pi}{12}$
- (2) $\frac{5\pi}{12}$
- (3) $\frac{\pi}{12}$
- (4) $-\frac{\pi}{12}$

46. Find $\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{3}\right)$

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

(4) $\frac{\pi}{3}$

47. If $\sin\left(\sin^{-1}\frac{1}{5} + \cos^{-1}(x)\right) = 1$, $\implies x =$

- (1) 1
 - (2) 0
 - (3) $\frac{4}{5}$
 - (4) $\frac{1}{5}$
-

48. Find the determinant of the matrix $\begin{bmatrix} 21 & 11 & 10 \\ 25 & 15 & 10 \\ 64 & 27 & 37 \end{bmatrix}$

- (1) 1190
 - (2) 841
 - (3) 0
 - (4) 1
-

49. Find the determinant of the matrix $\begin{bmatrix} 10 & 4 \\ 13 & 5 \end{bmatrix}$

- (1) 102
 - (2) 2
 - (3) -2
 - (4) -102
-

50. If $\det\left(\begin{bmatrix} x & 15 \\ 4 & 4 \end{bmatrix}\right) = 0$, $\implies x$.

- (1) 15
- (2) -15
- (3) 12
- (4) 60

51. Find $\det \begin{pmatrix} 3 & \sqrt{3} & \sqrt{3} \\ 4 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}$

- (1) 0
- (2) 12
- (3) $4\sqrt{3}$
- (4) $3 - 4\sqrt{3}$

52. Find $5 \times \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

- (1) $\begin{bmatrix} 5 & 10 \\ 15 & 20 \end{bmatrix}$
- (2) $\begin{bmatrix} 5 & 2 \\ 3 & 20 \end{bmatrix}$
- (3) $\begin{bmatrix} 5 & 10 \\ 3 & 4 \end{bmatrix}$
- (4) $\begin{bmatrix} 1 & 10 \\ 15 & 20 \end{bmatrix}$

53. Find $\begin{bmatrix} 5 & -1 \\ 6 & 7 \end{bmatrix} \times \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$

- (1) $\begin{bmatrix} 7 & 11 \\ 33 & 34 \end{bmatrix}$
- (2) $\begin{bmatrix} 7 & 1 \\ 33 & 34 \end{bmatrix}$
- (3) $\begin{bmatrix} 7 & 1 \\ 34 & 33 \end{bmatrix}$
- (4) $\begin{bmatrix} 16 & 5 \\ 39 & 25 \end{bmatrix}$

54. Given $A = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$, find A' (the transpose of A)

- (1) $\begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$
 (2) $\begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix}$
 (3) $\begin{bmatrix} 3 & 2 & 1 \end{bmatrix}$
 (4) $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$
-

55. Find $\frac{d}{dx}(\log(5x))$

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

56. Find $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \times \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

- (1) $\begin{bmatrix} 1 & 0 \\ 0 & 4 \end{bmatrix}$
 (2) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$
 (3) $\begin{bmatrix} 1 & 2 \\ 0 & 4 \end{bmatrix}$
 (4) $\begin{bmatrix} 1 & 2 \\ 3 & 0 \end{bmatrix}$
-

57. If $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, **then** A^{100} **is**

- (1) $100A$
 (2) $101A$
 (3) A
 (4) $99A$
-

58. Find $\begin{bmatrix} 6 & 5 \end{bmatrix} \times \begin{bmatrix} -1 \\ 1 \end{bmatrix}$

- (1) $\begin{bmatrix} -6 & 5 \end{bmatrix}$
 - (2) $\begin{bmatrix} -6 \\ 5 \end{bmatrix}$
 - (3) $\begin{bmatrix} -1 \\ 1 \end{bmatrix}$
 - (4) $\begin{bmatrix} 1 \end{bmatrix}$
-

59. Find the product of $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ **and** $\begin{bmatrix} 4 & 0 \\ 0 & 4 \end{bmatrix}$

- (1) $\begin{bmatrix} 4 & 8 \\ 0 & 16 \end{bmatrix}$
 - (2) $\begin{bmatrix} 5 & 2 \\ 3 & 8 \end{bmatrix}$
 - (3) $\begin{bmatrix} 4 & 8 \\ 12 & 16 \end{bmatrix}$
 - (4) $\begin{bmatrix} 4 & 12 \\ 8 & 16 \end{bmatrix}$
-

60. Find the product of $\begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix}$ **and** $\begin{bmatrix} 2 \\ 5 \end{bmatrix}$

- (1) $\begin{bmatrix} 4 & 6 \\ 25 & 35 \end{bmatrix}$
 - (2) $\begin{bmatrix} 4 & 15 \\ 10 & 35 \end{bmatrix}$
 - (3) $\begin{bmatrix} 19 \\ 45 \end{bmatrix}$
 - (4) $\begin{bmatrix} 19 \\ 43 \end{bmatrix}$
-

61. Find $\begin{bmatrix} 3 & -2 \end{bmatrix} \begin{bmatrix} 1 \\ -1 \end{bmatrix}$

- (1) $\begin{bmatrix} 3 & 2 \end{bmatrix}$
- (2) $\begin{bmatrix} 3 \\ 2 \end{bmatrix}$

- (3) $\begin{bmatrix} 1 \\ 5 \end{bmatrix}$
(4) $\begin{bmatrix} 1 \\ 5 \end{bmatrix}$
-

62. Find $4 \times \begin{bmatrix} 2 & -2 \end{bmatrix}$

- (1) $\begin{bmatrix} 8 & -8 \end{bmatrix}$
(2) $\begin{bmatrix} 0 \end{bmatrix}$
(3) $\begin{bmatrix} 8 \\ -8 \end{bmatrix}$
(4) $\begin{bmatrix} 6 & 2 \end{bmatrix}$
-

63. Find the cofactor matrix of $\begin{bmatrix} 2 & 3 \\ 5 & 4 \end{bmatrix}$

- (1) $\begin{bmatrix} 4 & -5 \\ -3 & 2 \end{bmatrix}$
(2) $\begin{bmatrix} 4 & -3 \\ -5 & 2 \end{bmatrix}$
(3) $\begin{bmatrix} 4 & 5 \\ 3 & 0.2 \end{bmatrix}$
(4) $\begin{bmatrix} 4 & 3 \\ 5 & 2 \end{bmatrix}$
-

64. Find $\frac{d}{dx} (\log(x^9))$

- (1) $\frac{1}{x^9}$
(2) $\frac{1}{9x}$
(3) $\frac{9}{x}$
(4) $\frac{1}{x}$
-

65. If the direction ratios of two parallel lines are $\frac{x-19}{13} = \frac{y-17}{11} = \frac{z-15}{9}$, **then the direction ratios are**

- (1) 19, 17, 15
(2) 13, 11, 9

- (3) 19, 17, 9
 - (4) None of these
-

66. Through which of the following points does the line $\frac{x-11}{12} = \frac{y-12}{13} = \frac{z-13}{14}$ pass?

- (1) 11, 12, 13
 - (2) 11, 12, -13
 - (3) 12, 13, 14
 - (4) -11, -12, 13
-

67. If the direction ratios of two parallel lines are 2, 7, 9, then the value of x is

- (1) 9
 - (2) 18
 - (3) 27
 - (4) 3
-

68. If the direction ratios of two parallel lines are a, b, c and x, y, z , then $az =$

- (1) cy
 - (2) cx
 - (3) bz
 - (4) ax
-

69. If the direction ratios of two mutually perpendicular lines are 5, 2, 4 and 4, 8, x , then the value of x is

- (1) 9
 - (2) -9
 - (3) 8
 - (4) -8
-

70. Find the equation of a plane parallel to the plane $9x - 8y + 7z = 10$

- (1) $9x - 8y - 7z = 5$
 - (2) $9x - 8y + 7z = 5$
 - (3) $9x + 8y + 7z = 5$
 - (4) $9x - y + 7z = 5$
-

71. Find $|\vec{i} - \vec{j} - 3\vec{k}|$

- (1) 11
 - (2) $\sqrt{11}$
 - (3) $\sqrt{7}$
 - (4) $\sqrt{10}$
-

72. Find $(4\vec{i} + 3\vec{j})^2$

- (1) 7
 - (2) 19
 - (3) 25
 - (4) 49
-

73. Find $(7\vec{i} - 8\vec{j} + 9\vec{k}) \cdot (\vec{i} - \vec{j} + \vec{k})$

- (1) 25
 - (2) 24
 - (3) 23
 - (4) 22
-

74. Find $\vec{i} \cdot \vec{i} + \vec{i} \cdot \vec{j} + \vec{j} \cdot \vec{j} + \vec{j} \cdot \vec{k} + \vec{k} \cdot \vec{k}$

- (1) 5
 - (2) 4
 - (3) 3
 - (4) 2
-

75. Find $(11\vec{i} + \vec{j} + \vec{k}) \cdot (\vec{i} + \vec{j} + 11\vec{k})$

- (1) 22
 - (2) 23
 - (3) 24
 - (4) 20
-

76. Find $(\vec{k} \times \vec{j}) \cdot \vec{i}$

- (1) 0
 - (2) 1
 - (3) -1
 - (4) $2\vec{i}$
-

77. Find $(\vec{i} - 2\vec{j} + 5\vec{k}) \cdot (-2\vec{i} + 4\vec{j} + 2\vec{k})$

- (1) 20
 - (2) 18
 - (3) 0
 - (4) 4
-

78. Find $\vec{i} \cdot \vec{j} + (\vec{i} \times \vec{i})$

- (1) 2
 - (2) 1
 - (3) $\vec{k}$
 - (4) $-\vec{k}$
-

79. Which of the following is an objective function?

- (1) $x \geq 10$
- (2) $y \geq 0$
- (3) $z = 7x + 3y$
- (4) All of these

80. The maximum value of $z = 2x + y$ subject to the constraints $x + y \leq 35$, $x \geq 0$, and $y \geq 0$ is

- (1) 35
- (2) 105
- (3) 70
- (4) 140

81. The maximum value of $z = 3x - y$ subject to constraints

$$x + y \leq 8, \quad x \geq 0, \quad y \geq 0$$

- (1) -8
- (2) 24
- (3) 16
- (4) 8

82. The chance of getting a doublet in a throw of 2 dice is

- (1) $\frac{2}{3}$
- (2) $\frac{1}{6}$
- (3) $\frac{5}{6}$
- (4) $\frac{5}{36}$

83. The addition theorem of probability is

- (1) $P(A \cup B) = P(A) + P(B)$
- (2) $P(A \cup B) = P(A) + P(B) + P(A \cap B)$
- (3) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
- (4) $P(A \cup B) = P(A) \cdot P(B)$

84. If odds in favour of event E are $a : b$, then $P(E) =$

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

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

85. The multiplication theorem of probability is

- (1) $P(A \cap B) = P(A) \cdot P(B)$
(2) $P(A \cap B) = P(A) + P(B) - P(A \cup B)$
(3) $P(A \cap B) = P(A) \cdot P(B|A)$
(4) None of these
-

86. Find $\frac{d}{dx} (e^{3-2x})$

- (1) e^{3-2x}
(2) $2e^{3-2x}$
(3) $-2e^{3-2x}$
(4) $-e^{3-2x}$
-

87. Find $\int 2^{x+1} dx$

- (1) $\frac{2^{x+1}}{\log 2} + k$
(2) $2^{x+1} \log 2 + k$
(3) $(x+1) \cdot 2^x + k$
(4) $2^{x+1} + k$
-

88. Find $\int \frac{(\sqrt{x}+1)^2}{x\sqrt{x}+2x+\sqrt{x}} dx$

- (1) $\sqrt{x} + k$
(2) $\frac{1}{2}\sqrt{x} + k$
(3) $2\sqrt{x} + k$
(4) $2x + k$
-

89. Find $\int_{-1}^1 \sin^{13} x \cdot \cos^{12} x \, dx$

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

90. Find $\int_0^2 e^x \, dx$

- (1) e^2
 - (2) $e^2 - 2$
 - (3) $e^2 - 1$
 - (4) $e - 1$
-

91. Evaluate $\int_{\alpha}^{\beta} \phi(x) \, dx + \int_{\beta}^{\alpha} \phi(x) \, dx$

- (1) 2
 - (2) 1
 - (3) 0
 - (4) $2 \int_{\alpha}^{\beta} \phi(x) \, dx$
-

92. Find $\frac{d}{dx} \begin{bmatrix} x & x \\ 2 & x \end{bmatrix}$

- (1) $x^2 - 2x$
 - (2) $2x - 2$
 - (3) $2x + 2$
 - (4) $x - 2$
-

93.

$$\frac{d}{dx} \lim_{n \rightarrow 1} \frac{x^n - 1}{n + 1}$$

- (1) 0
- (2) $\frac{1}{2}$

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

94. Find $\frac{d}{dx} \{\log_3(x) \cdot \log_x(3)\}$

- (1) $\frac{1}{9}$
- (2) 6
- (3) $2 \log 3$
- (4) 0

95. Find $\frac{d}{dx} \log(x^{100})$

- (1) $\frac{1}{x^{100}}$
- (2) $\frac{1}{x}$
- (3) $\frac{100}{x}$
- (4) $\frac{1}{100x}$

96. Find $\frac{d}{dx} \sin^{-1}(2x\sqrt{1-x^2})$

- (1) $2 \sin^{-1}(x)$
- (2) $\frac{1}{\sqrt{1-x^2}}$
- (3) $\frac{2}{\sqrt{1-x^2}}$
- (4) $\frac{1}{\sqrt{1-4x^2(1-x^2)}}$

97. Evaluate $\int e^{2 \log(x)} dx$

- (1) $e^{2 \log(x)} + k$
 - (2) $\frac{x^2}{2} + k$
 - (3) $\frac{x^3}{3} + k$
 - (4) $3x^3 + k$
-

98. Find $\frac{d}{dx} \begin{bmatrix} x & 15 \\ 4 & 4 \end{bmatrix}$

- (1) $4x$
 - (2) 4
 - (3) -60
 - (4) -4
-

99. Evaluate $\int x^m \cdot x^n dx$

- (1) $\frac{x^{m+1} \cdot x^{n+1}}{m+n+2} + k$
 - (2) $\frac{x^{m+n}}{m+n} + k$
 - (3) $\frac{x^{m+n+1}}{m+n+1} + k$
 - (4) $(m+n)x^{m+n-1} + k$
-

100. Evaluate $\int e^3 \cdot e^x dx$

- (1) $e^x + k$
 - (2) $\frac{e^{3+x}}{3} + k$
 - (3) $e^{x+3} + k$
 - (4) $3e^{x+3} + k$
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