



NDA MATHS PAPER – 2

1. If α, β are real, then what is $\left| \frac{\alpha + i\beta}{\beta + i\alpha} \right|$ equal to?
(a) 0 (b) $1/2$ (c) 1 (d) 2
2. What is square root of $-5 + 12i$?
(a) $2 - 3i$ (b) $2 + 3i$ (c) $-2 + 3i$ (d) None
3. If $\alpha = \frac{1 + \sqrt{2}i}{2}$, then, what is the value of $1 + \alpha^8 + \alpha^{16} + \alpha^{24} + \alpha^{32}$?
(a) 0 (b) 1 (c) ω (d) ω^2
4. What is argument of $(1 - \sin \theta) + i \cos \theta$?
(a) $\frac{\pi}{2} - \frac{\theta}{2}$ (b) $\frac{\pi}{2} + \frac{\theta}{2}$ (c) $\frac{\pi}{4} - \frac{\theta}{2}$ (d) $\frac{\pi}{4} + \frac{\theta}{2}$
5. The number of non zero integral solutions of the equation $|1 - 2i|^x = 5^x$ is
(a) Zero (b) One (c) Two (d) Three
6. What is coefficient of x^3 in expansion of $\frac{2-2x}{(1+3x)^2}$?
(a) -272 (b) -540 (c) -870 (d) -918
7. What is middle term in expansion of $\left(1 - \frac{x}{2}\right)^8$?
(a) $\frac{35x^4}{8}$ (b) $\frac{17x^4}{8}$ (c) $\frac{35x^4}{9}$ (d) None
8. If the coefficients of x^r and x^{r+1} are equal in expansion of $(1+x)^{2n+1}$, then value of r is
(a) n (b) $\frac{2n-1}{2}$ (c) $\frac{2n+1}{2}$ (d) $n+1$
9. If sum of fifth and sixth terms in expansion of $(x-y)^n, n \geq 5$ is zero, then x/y is equal to
(a) $\frac{n-5}{6}$ (b) $\frac{n-4}{5}$ (c) $\frac{5}{n-4}$ (d) $\frac{6}{n-5}$



10. How many 3 – digits numbers each less than 600 can be formed from {1, 2, 3, 4, 7, 9} if repetition of digits not allowed?
(a) 216 (b) 180 (c) 144 (d) None
11. From 7 men and 4 women a committee of 6 is to be formed such that the committee contains atleast two women. How many ways committee will be formed?
(a) 210 (b) 371 (c) 462 (d) 5544
12. What is the number of words formed from letters of word 'JOKE' so that vowels and consonants are alternate?
(a) 4 (b) 8 (c) 12 (d) None
13. What is value of $\sum_{r=1}^n \frac{r(r+1)}{2}$?
(a) $2^n - 1$ (b) 2^n (c) 2^{n-1} (d) $2^n + 1$
14. How many different permutations can be made out of the letters of word PERMUTATION?
(a) 19958400 (b) 19954800 (c) 19952400 (d) None
15. The value of $\frac{1}{\log_3 e} + \frac{1}{\log_3 e^2} + \dots \infty$ is
(a) $\log_3 9$ (b) 0 (c) 1 (d) $\log_3 3$
16. What is 10th Common term of the series 2 + 6 + 10 ... and 1 + 6 + 11 + ...?
(a) 180 (b) 186 (c) 196 (d) 206
17. If the n^{th} term of an A.P. is $3n + 7$, then what is sum of first 50 terms?
(a) 3925 (b) 4100 (c) 4175 (d) 8200
18. If the sum of first two terms and the sum of first four terms of a G.P. with positive common ratio are 8 and 80 respectively, then what is 6th term?
(a) 88 (b) 243 (c) 486 (d) 1458
19. If a, b, c are three positive numbers of an A.P. then



- (a) $ac > b^2$ (b) $b^2 > a + c$
(c) $ab + bc \leq 2ac$ (d) $ab + bc \geq 2ac$
20. If $x^2 + px + 4 > 0$ for all real values of x , then which one of the following is correct?
(a) $|P| < 4$ (b) $|P| \leq 4$ (c) $|P| > 4$ (d) $|P| \geq 4$
21. If both roots of equation $x^2 - 2kx + k^2 - 4 = 0$, lies between -3 and 5 , then which one of the following is correct?
(a) $-2 < k < 2$ (b) $-5 < k < 3$ (c) $-3 < k < 5$ (d) $-1 < k < 3$
22. If the graph of quadratic polynomial lies entirely above x -axis, then which one of the following is correct?
(a) both roots are real (b) one root is real and other is imaginary
(c) both roots are imaginary (d) None
23. The equation $x^2 + |1 - x| - 5 = 0$ has
(a) two rational roots (b) two irrational roots
(c) No real roots (d) None
24. If α and $\beta (\neq 0)$ are roots of quadratic equation $x^2 + \alpha x - \beta = 0$, then quadratic expression $-x^2 + \alpha x + \beta$ has
(a) least value $-1/4$ (b) Greatest value $9/4$
(c) Greatest value $1/4$ (d) None
25. If set A has 10 elements then number of subsets of A having exactly 2 elements is
(a) 20 (b) 40 (c) 45 (d) 90
26. If R be relation from A to $B, B = \{1, 3, 5\}, A = \{1, 2, 3, 4\}$ such that $R = \{(a, b); a < b, a \in A \text{ and } b \in B\}$. What is $R \circ R^{-1}$?
(a) $\{(1, 3), (1, 5), (2, 3), (2, 5), (3, 5), (4, 5)\}$
(b) $\{(3, 1), (5, 1), (3, 2), (5, 2), (5, 3), (5, 4)\}$
(c) $\{(3, 3), (3, 5), (5, 3), (5, 5)\}$
(d) None



27. The remainder and Quotient of binary division $(101110)_2 \div (110)_2$ are respectively
(a) $(111)_2$ and $(100)_2$ (b) $(100)_2$ and $(111)_2$
(c) $(101)_2$ and $(100)_2$ (d) None
28. If $A = \{x/x \text{ is multiple of } 2\}$, $B = \{x/x \text{ is multiple of } 5\}$ and $C = \{x/x \text{ is multiple of } 10\}$, then $A \cap (B \cap C)$ is equal to
(a) A (b) B (c) C (d) None
29. In a school, all the students play atleast one of three games table tennis, chess and carrom, 60 play chess, 50 play table tennis, 48 play carrom, 12 play chess and carrom, 15 play carrom and table tennis, 20 play table tennis and chess.
What is maximum number of students in the school?
(a) 111 (b) 123 (c) 125 (d) 135
30. If $f(x) = x^2$, $g(x) = \tan x$ and $h(x) = \log x$ then $f \circ (f \circ f)(2)$ is equal to
(a) 2 (b) 8 (c) 16 (d) 256
31. If $\sin(\pi \cos x) = \cos(\pi \sin x)$, then what is value of $\sin 2x$?
(a) $-1/4$ (b) $-1/2$ (c) $-3/4$ (d) -1
32. What is value of $\operatorname{cosec}\left(\frac{13\pi}{12}\right)$?
(a) $\sqrt{6} + \sqrt{2}$ (b) $-\sqrt{6} + \sqrt{2}$ (c) $\sqrt{6} - \sqrt{2}$ (d) $-\sqrt{6} - 2$
33. If $\sin A = \sin B$ and $\cos A = \cos B$ then which one of the following is correct?
(a) $b = n\pi + A$ (b) $A = 2n\pi - B$ (c) $A = 2n\pi + B$ (d) $B = n\pi - A$
34. If $\alpha = \pi/8$, then what is the value of $\cos \alpha, \cos 2\alpha, \cos 4\alpha$?
(a) 0 (b) $1/4$ (c) 8 (d) 4
35. If $\sin^2 x - \cos^2 x = P$ then which one of the following correct?
(a) $P = 1$ (b) $P = 0$ (c) $|P| > 1$ (d) $|P| \leq 1$



36. What is $\frac{\sin \theta + 1}{\cos \theta}$ equal to?
 (a) $\frac{\sin \theta + \cos \theta - 1}{\sin \theta + \cos \theta + 1}$ (b) $\frac{\sin \theta + \cos \theta + 1}{\sin \theta + \cos \theta - 1}$ (c) $\frac{\sin \theta - \cos \theta - 1}{\sin \theta + \cos \theta + 1}$ (d) None
37. If $x = \sin \theta + \cos \theta$ and $y = \sin \theta \cdot \cos \theta$, then what is the value of $x^4 - 4x^2y - 2x^2 + 4y^2 + 4y + 1$?
 (a) 0 (b) 1 (c) 2 (d) None
38. The solution of $3 \tan^2 x = 1$ is given by
 (a) $x = n\pi \pm \pi/3$ (b) $x = n\pi + \pi/3$ (c) $x = n\pi \pm \pi/6$ (d) $x = n\pi + \pi/6$
39. If $P = \tan\left(-11\frac{\pi}{6}\right)$, $q = \tan\left(\frac{21\pi}{4}\right)$ and $r = \cot\left(\frac{283\pi}{6}\right)$ then which of the following is correct?
 1. The value of $p \times r$ is 2. 2. p, q, r are G.P.
 (a) Only I (b) Only II (c) both (d) None
40. If $A = (\cos 12^\circ - \cos 36^\circ)(\sin 96^\circ + \sin 24^\circ)$, $B = (\sin 60^\circ - \sin 12^\circ) \times (\cos 48^\circ - \cos 72^\circ)$. Then what is A/B ?
 (a) -1 (b) 0 (c) 1 (d) 2
41. If ratio of angles A, B, C of a triangle is $2 : 5 : 5$, what is value of $\tan B \cdot \tan C$?
 (a) $4 + \sqrt{3}$ (b) $4 + 2\sqrt{3}$ (c) $7 + 4\sqrt{3}$ (d) $3 + 3\sqrt{3}$
42. In ΔABC if $\cos B = \frac{\sin A}{1 + \sin C}$ then ΔABC is
 (a) Isosceles (b) equilateral (c) Right (d) Scalene.
43. If $x = 4 \tan^{-1} \frac{1}{5}$, $y = \tan^{-1} \frac{1}{10}$ and $z = \tan^{-1} \frac{1}{99}$. Then value of $(x - y + z)$ is
 (a) $\pi/2$ (b) $\pi/3$ (c) $\pi/6$ (d) $\pi/4$
44. Which is correct?
 (i) $\tan^{-1}(1) + \tan^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{4}$ (ii) $\sin^{-1}\frac{1}{3} + \cos^{-1}\frac{1}{3} = \frac{\pi}{2}$
 (a) Only (i) (b) Only (ii) (c) both (d) None



45. If $x, x - y$ and $x + y$ are angles of a triangle such that $\tan(x - y)$, $\tan x$ and $\tan(x + y)$ are G, P , then what is value of x ?
- (a) $\pi/4$ (b) $\pi/3$ (c) $\pi/6$ (d) $\pi/2$
46. If $f(x) = \frac{1}{\sqrt{18-x^2}}$ then $\lim_{x \rightarrow 3} \frac{f(x)-f(3)}{x-3}$ is equal to
- (a) 0 (b) $-\frac{1}{9}$ (c) $1/3$ (d) $1/9$
47. What is value of $\lim_{x \rightarrow 2} \frac{x \sin 5x}{\sin^2 4x}$?
- (a) 0 (b) $5/4$ (c) $5/16$ (d) $25/4$
48. If $f(x) = \begin{cases} 3x - 4, & 0 \leq x \leq 2 \\ 2x + \lambda, & 2 < x \leq 3 \end{cases}$ is continuous at $x = 2$ then value of λ is
- (a) 1 (b) -1 (c) 2 (d) -2
49. At how many points is the function $f(x) = [x]$ discontinuous?
- (a) 1 (b) 2 (c) 3 (d) Infinite
50. What is value of $\lim_{x \rightarrow 0} \frac{\sin 2x + 4x}{2x + \sin 4x}$ equal to?
- (a) 0 (b) $1/2$ (c) 1 (d) 2
51. What is $\lim_{n \rightarrow \infty} \frac{1+2+3+\dots+n}{1^2+2^2+\dots+n^2}$ equal to?
- (a) 5 (b) 2 (c) 1 (d) 0
52. What is value of $\lim_{x \rightarrow 0} \frac{a^{x^2+[x]} - 1}{x + [x]}$?
- (a) $1 - \frac{1}{a}$ (b) 0 (c) $\log a$ (d) Does not exists
53. If $\lim_{x \rightarrow \pi/2} \frac{\sin x}{x} = l$ and $\lim_{x \rightarrow \infty} \frac{\cos x}{x} = m$, then which one of the following is correct?
- (a) $l = 1, m = 1$ (b) $l = \frac{1}{\pi}, m = \infty$
(c) $l = \frac{2}{\pi}, m = 0$ (d) None
54. If $f(x) = [|x| - |x - 1|]^2$ then, what is $f'(x)$ when $x > 1$?
- (a) 0 (b) $2x - 1$ (c) $4x - 2$ (d) $8x - 4$



55. If $\frac{d}{dx} \left(\frac{x^4 + x^2 + 1}{x^2 + x + 1} \right) = Ax + B$, Then what are value of A and B?
(a) 2, -1 (b) 2, 1 (c) -2, 2 (d) None
56. What is derivative of $\log_5 x$ with respect of $\log_x^5$?
(a) $-(\log_5^x)^{-2}$ (b) $(\log_5^x)^{-2}$ (c) $-(\log_x^5)^{-2}$ (d) $(\log_x^5)^{-2}$
57. If $f(x) = \tan x + e^{-2x} - 7x^3$, then value of $f'(0)$ is
(a) -2 (b) -1 (c) 0 (d) 3
58. What is derivative of $f(x) = \frac{7x}{(2x+1)(x+3)}$?
(a) $\frac{-3}{(x+3)^2} - \frac{2}{(2x-1)^2}$ (b) $\frac{-3}{(x-3)^2} - \frac{2}{(2x-1)^2}$
(c) $\frac{2}{(x+3)^2} + \frac{1}{(2x-1)^2}$ (d) None
59. What is/are critical points of the function $f(x) = x^2(5-2x)$ on the interval $[-1, 2]$?
(a) 1 (b) 0, 1 (c) 3/2 (d) 0, 3/2
60. What is x - coordinate of point on the curve $f(x) = \sqrt{x}(7x-6)$, where tangent is parallel to x - axis?
(a) $\frac{-1}{3}$ (b) 2/7 (c) 6/7 (d) 1/2
61. A balloon is pumped at rate of $4\text{cm}^3/\text{s}$. What is rate at which its surface are increases, if radius is 4cm ?
(a) $1\text{cm}^2/\text{s}$ (b) $2\text{cm}^2/\text{s}$ (c) $3\text{cm}^2/\text{s}$ (d) $4\text{cm}^2/\text{s}$
62. A cylinder is inscribed in a sphere of radius r . What is the radius of cylinder of maximum volume?
(a) $\frac{2r}{\sqrt{3}}$ (b) $\frac{\sqrt{2}r}{\sqrt{3}}$ (c) r (d) $\sqrt{3}r$
63. If $f(x) = x + \frac{1}{x}$, when $x \in (0, 1)$, then which is correct?
(a) $f(x)$ is increases in the interval (b) $f(x)$ decreased in the interval



(c) $f(x)$ fluctuates in the interval (d) None

64. What is the minimum value of $[x(x-1)+1]^{1/3}$, where $0 < x < 1$?

- (a) $\left(\frac{5}{4}\right)^{1/3}$ (b) 1 (c) $1/3$ (d) $\left(\frac{4}{5}\right)^{1/3}$

65. If $\int x^2 \log x \, dx = \frac{x^2}{m} \log x + \frac{x^2}{n} + C$ then value of m and n are

- (a) $\frac{1}{2}, \frac{1}{6}$ (b) 3, -9 (c) 3, 9 (d) 3, 3

66. If $\int x \cdot \tan^{-1} x \, dx = A(x^2 + 1) \cdot \tan^{-1} x + Bx + C$ then what is value of A ?

- (a) 1 (b) $1/2$ (c) $-1/2$ (d) $1/4$

67. The value of $\int \frac{1}{\log x} - \frac{1}{(\log x)^2} \, dx$ is

- (a) $\frac{x}{\log x} + c$ (b) $\frac{x}{(\log x)^2} + c$ (c) $x(\log x) + c$ (d) None

68. The value of $\int_0^\pi \frac{x \, dx}{1 + \sin x}$ is

- (a) $-\pi$ (b) 0 (c) π (d) 2π

69. If $0 < a < b$, then $\int_a^b \frac{1}{x} \, dx$ is equal to

- (a) $|b| - |a|$ (b) $|a| = |b|$ (c) 0 (d) None

70. What is the area of region bounded by parabola as $y^2 = 6(x-1)$ and $y^2 = 3x$?

- (a) $\frac{\sqrt{6}}{3}$ (b) $\frac{2\sqrt{6}}{3}$ (c) $\frac{4\sqrt{6}}{3}$ (d) $\frac{5\sqrt{6}}{3}$

71. The value of $\int_0^{\sqrt{2}} [x^2] \, dx$ is equal to

- (a) $\sqrt{2} - 1$ (b) $1 - \sqrt{2}$ (c) $2(\sqrt{2} - 1)$ (d) $\sqrt{3} - 1$

72. What are the order and degree of differential equation $\left(\frac{d^2 y}{dx^2}\right)^2 = y^4 + \left(\frac{dy}{dx}\right)^5$?

- (a) 4, 5 (b) 2, 3 (c) 3, 2 (d) 5, 4



73. The general solution of differential equation $\frac{dy}{dx} = \frac{ax+b}{by+k}$ represents a circle only when
(a) $a = b = 0$ (b) $a = -b \neq 0$
(c) $a = b \neq 0, h = k$ (d) $a = b \neq 0$
74. If $x \, dy = y \, (dx + dy, y); y(1) = 1, y(x) > 0$ then what is value of $y(-3)$?
(a) 3 (b) 2 (c) 1 (d) 0
75. What is solution of differential equation $\frac{dx}{dy} + \frac{x}{y} = y^2$?
(a) $xy = x^2 + C$ (b) $xy = y^2 + C$ (c) $4xy = y^2 + C$ (d) $3xy = y^2 + C$
76. What is the ratio in which the point $C\left(\frac{-2}{3}, \frac{-20}{3}\right)$ divides the line joining the points $A(-2, -2)$ and $B(2, -4)$?
(a) 1 : 3 (b) 3 : 4 (c) 1 : 2 (d) 2 : 3
77. What is equation of straight line passing through point $(2, 3)$ and making an intercept on the positive y -axis equal to twice its intercept on the positive x -axis?
(a) $2x + y = 5$ (b) $2x + y = 7$ (c) $x + 2y = 7$ (d) $2x - y = 1$
78. What is the equation of straight line passes through intersection of line $\frac{x}{2} + \frac{y}{5} = 1$ and $\frac{x}{2} + \frac{y}{2} = 1$ and parallel to line $4x + 5y - 6 = 0$?
(a) $20x + 25y - 54 = 0$ (b) $25x + 20y - 54 = 0$
(c) $4x + 5y - 54 = 0$ (d) $4x + 5y - 45 = 0$
79. What is equation of line perpendicular to $y = x$ and passes through pt $(3, 2)$?
(a) $x - y = 5$ (b) $x + y = 5$
(c) $x + y = 1$ (d) $x - y = 1$
80. The distance of pt $(1, 3)$ from the line $2x + 3y = 6$ measured parallel to line $4x + y = 4$ is
(a) $\frac{5}{\sqrt{13}}$ (b) $\frac{2}{\sqrt{13}}$ (c) $\sqrt{17}$ (d) $\frac{\sqrt{17}}{2}$



81. If a circle of radius b units with centre at $(0, b)$ touches line $y = x - \sqrt{2}$, then what is value of b ?
- (a) $2 + \sqrt{2}$ (b) $2 - \sqrt{2}$ (c) $2\sqrt{2}$ (d) $\sqrt{2}$
82. What is the radius of circle passes through point $(2, 4)$ and having centre at intersection of lines $x - y = 4$ and $2x + 3y + 7 = 0$?
- (a) 3 (b) 5 (c) $3\sqrt{3}$ (d) $5\sqrt{2}$
83. What is equation of hyperbola having latus rectum and eccentricity 8 and $3/\sqrt{5}$ respectively?
- (a) $\frac{x^2}{25} - \frac{y^2}{30} = 1$ (b) $\frac{x^2}{40} - \frac{y^2}{30} = 1$ (c) $\frac{x^2}{40} - \frac{y^2}{30} = 1$ (d) $\frac{x^2}{30} - \frac{y^2}{25} = 1$
84. If the ellipse $9x^2 + 16y^2 = 144$ intercept line $3x + 4y = 12$ then what is length of chord so formed?
- (a) 5 (b) 6 (c) 8 (d) 10
85. The axis of parabola $y^2 = -2x$ is
- (a) $x = 0$ (b) $y = 0$ (c) $x = 2$ (d) $y = 2$
86. What is distance of point $(2, 3, 4)$ from the plane $3x - 6y + 2z + 11 = 0$?
- (a) 1 (b) 2 (c) 3 (d) 4
87. Under which conditions following lines $x = ay + b, z = cy + d$ and $x = ey + f$ and $z = gy + h$ are perpendicular?
- (a) $ae + cg - 1 = 0$ (b) $ae + bf - 1 = 0$
(c) $ae + cg + 1 = 0$ (d) $ag + ce + 1 = 0$
88. The equation of plane passing through the intersection of planes $2x + y + 2z = 9$ and $4x - 5y - 4z = 1$ and point $(3, 2, 1)$ is
- (a) $10x - 2y + 2z = 28$ (b) $10x + 2y + 2z = 28$
(c) $10x + 2y - 2z = 28$ (d) None
89. What is equation of sphere with unit radius having centre at origin?
- (a) $x^2 + y^2 + z^2 = 0$ (b) $x^2 + y^2 + z^2 = 1$



(c) $x^2 + y^2 + z^2 = 2$

(d) $x^2 + y^2 + z^2 = 3$

90. What is the angle between the lines $\frac{x-2}{1} = \frac{y+1}{-2} = \frac{z+2}{1}$ and $\frac{x-1}{1} = \frac{2y+3}{3} = \frac{z+5}{1}$?

(a) $\pi/2$

(b) $\pi/3$

(c) $\pi/3$

(d) None

91. If $\vec{a}$ and $\vec{b}$ are vectors such that $|\vec{a}| = 2$, $|\vec{b}| = 7$ and $\vec{a} \times \vec{b} = 3\hat{i} + 2\hat{j} + 6\hat{k}$ then what is the acute angle between $\vec{a}$ and $\vec{b}$?

(a) 30°

(b) 45°

(c) 60°

(d) 90°

92. If $|\vec{a}| = 3$, $|\vec{b}| = 4$ and $|\vec{a} - \vec{b}| = 5$ then $|\vec{a} + \vec{b}|$ is

(a) 8

(b) 6

(c) $5\sqrt{2}$

(d) 5

93. A spacecraft at $\hat{i} + 2\hat{j} + 3\hat{k}$ is subjected to a force $\lambda\hat{k}$ by firing a rocket. The space craft is subjected to a moment of magnitude

(a) λ

(b) $\sqrt{3}\lambda$

(c) $\sqrt{5}\lambda$

(d) None

94. If the vectors $\alpha\hat{i} + \alpha\hat{j} + \gamma\hat{k}$, $\hat{i} + \hat{k}$ and $\gamma\hat{i} + \gamma\hat{j} + \beta\hat{k}$ lies on a plane, then γ is

(a) A.M. of α and β

(b) G.M. of α and β

(c) H.M. of α and β

(d) None

95. If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$, then what is $\vec{r} \cdot (\hat{i} + \hat{j} + \hat{k})$?

(a) x

(b) $x + y$

(c) $-(x + y + z)$

(d) $(x + y + z)$

96. If A is a square matrix of order 3 and $|A| = 5$, then what is $|(2A)^{-1}|$?

(a) $1/10$

(b) $2/5$

(c) $8/5$

(d) $1/40$

97. What is the value of determinant $\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+xyz & 1 \\ 1 & 1 & 1+xyz \end{vmatrix}$?

(a) $1 + x + y + z$

(b) $2xyz$

(c) $x^2y^2z^2$

(d) $2x^2y^2z^2$

98. If $A = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$ then A^3 is

(a) $\begin{bmatrix} \cos 3\theta & \sin 3\theta \\ -\sin 3\theta & \cos 3\theta \end{bmatrix}$

(b) $\begin{bmatrix} \cos^3 \theta & \sin^3 \theta \\ -\sin^3 \theta & \cos^3 \theta \end{bmatrix}$



(c) $\begin{bmatrix} \cos 3\theta & -\sin 3\theta \\ \sin 3\theta & \cos 3\theta \end{bmatrix}$

(d) None

99. If $A = \begin{bmatrix} 3 & 2 & 0 \\ 2 & 4 & 0 \\ 1 & 1 & 0 \end{bmatrix}$, then adjoint of A is

(a) $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ -2 & -1 & 8 \end{bmatrix}$

(b) $\begin{bmatrix} 0 & 0 & -2 \\ 0 & 0 & -1 \\ 0 & 0 & 8 \end{bmatrix}$

(c) $\begin{bmatrix} 0 & 0 & 2 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$

(d) None

100. If A and B are two matrices of same order then which is correct?

(i) $A^2 - B^2 = (A + B)(A - B)$

(ii) $(A - I)(I + A) = 0 \Leftrightarrow A^2 = I$

(a) Only (i)

(b) Only (ii)

(c) both

(d) None

101. A square matrix A is called Orthogonal if

(a) $A^2 = A$

(b) $A' = A^{-1}$

(c) $A = A^{-1}$

(d) $A = A'$

102. If $a \neq b \neq c$ then value of x satisfy the equation $\begin{vmatrix} 0 & x-a & x-b \\ x+a & 0 & x-c \\ x+b & x+c & 0 \end{vmatrix} = 0$ is

(a) a

(b) b

(c) c

(d) 0

103. For two mutually exclusive events A and B , $P(A) = 0.2$ $P(A \cap B) = 0.3$. What is $P\left(\frac{A}{A \cup B}\right)$?

(a) $1/2$

(b) $2/5$

(c) $2/7$

(d) $2/3$

104. A fair coin is tossed 100 times. What is the probability of getting tails an odd number of times?

(a) $1/2$

(b) $3/8$

(c) $1/4$

(d) $1/8$

105. The mean and standard deviation of a binomial distribution are 12 and 2 respectively. What is number of trials?

(a) 2

(b) 12

(c) 18

(d) 24

106. If A and B are two events with $P(A) = 1/3$, $P(B) = 1/6$ and $P(A \cap B) = \frac{1}{12}$. What is $P(B/\bar{A})$?

(a) $1/5$

(b) $1/7$

(c) $1/8$

(d) $1/10$



107. 8 coins are tossed simultaneously. Probability of getting at least 6 heads is
(a) $7/64$ (b) $57/64$ (c) $37/256$ (d) $229/256$
108. There are n socks in a drawer of which 3 socks are red. If 2 of the socks are chosen then probability that both selected socks are red is $1/2$, then n is
(a) 3 (b) 4 (c) 5 (d) 6
109. A and B are two events such that $\bar{A}$ and $\bar{B}$ are exclusive if $P(A) = 0.5$, $P(B) = 0.6$ then $P\left(\frac{A}{B}\right)$ is
(a) $1/5$ (b) $1/6$ (c) $2/5$ (d) $1/3$
110. Three dice are thrown simultaneously. What is probability that sum of numbers on three faces is at least 57
(a) $\frac{17}{18}$ (b) $53/54$ (c) $103/108$ (d) $215/216$
111. What is A.M. of $nC_1, nC_2, nC_3, \dots, nC_n$?
(a) $\frac{2^n - 1}{n}$ (b) $\frac{2^n}{n+1}$ (c) $\frac{2^n}{n}$ (d) $\frac{2^{n+1}}{n+1}$
112. If covariance between x and y is 30, variance x is 25 and variance of y is 144. Then correlation coefficient r is
(a) 0.4 (b) 0.5 (c) 0.6 (d) 0.7
113. What is Median of 4.6, 0, 9.3, -4.8, 7.6, 2.3, 12.7, 3.5, 8.2, 6.1, 3.9, 5.2?
(a) 3.8 (b) 4.9 (c) 5.7 (d) 6.0
114. The variance of 25 observations is 4. If 2 is added to each observation then new variance will be
(a) 2 (b) 4 (c) 6 (d) 8
115. The average age of combined group of Men and Women is 25 years. If average age of Men is 26 years and the average age of Women is 21 years. Then the percentage of Men and Women in group is respectively.
(a) 20, 80 (b) 40, 60 (c) 60, 40 (d) 80, 20



116. Geometric Mean of $1, 2, 2^2 \dots 2^n$ is
(a) $2^{n/2}$ (b) $2^{\frac{n+1}{2}}$ (c) 2^n (d) $2^{1/n}$
117. In an examination 40% of candidates got second class. When data are represented by a pie chart, what is angle corresponding to second class?
(a) 40° (b) 90° (c) 144° (d) 320°
118. The algebraic sum of deviations of 20 observations measured from 30 is 2. What is Mean?
(a) 30 (b) 32 (c) 30.2 (d) 30.1
119. Mode of data 2, 3, 4, 2, 5, 4, 3, 2, 1 is
(a) 2 (b) 3 (c) 4 (d) 5
120. If $\sum_{i=1}^n (x_i - 2) = 110$ and $\sum_{i=1}^n (x_i - 50) = 20$, what is Mean?
(a) $11/2$ (b) $2/11$ (c) $17/3$ (d) $17/9$