Volume 1 - One Mark Questions with Answer Key

12th Standard

Maths

1) If A is a 3 × 3 non-singular matrix such that $AA^T = A^TA$ and $B = A^{-1}A^T$, then BB^T =

(a) A (b) B (c) I (d) B^T

2) If $A = \begin{bmatrix} 3 & 5 \\ 1 & 2 \end{bmatrix}$, B = adj A and C = 3A, then $\frac{|adjB|}{|C|}$ =

(a) $\frac{1}{3}$ (b) $\frac{1}{9}$ (c) $\frac{1}{4}$ (d) 1

3) If $A\begin{bmatrix} 1 & -2 \\ 1 & 4 \end{bmatrix} = \begin{bmatrix} 6 & 0 \\ 0 & 6 \end{bmatrix}$, then A =

(a) $\begin{bmatrix} 1 & -2 \\ 1 & 4 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 2 \\ -1 & 4 \end{bmatrix}$ (c) $\begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 4 & -1 \\ 2 & 1 \end{bmatrix}$

4) If $A = \begin{bmatrix} 7 & 3 \\ 4 & 2 \end{bmatrix}$, then 9I - A =

(a) A^{-1} (b) $\frac{A^{-1}}{2}$ (c) $3A^{-1}$ (d) $2A^{-1}$

5) If $A = \begin{bmatrix} 3 & 1 & -1 \\ 2 & -2 & 0 \\ 1 & 2 & -1 \end{bmatrix}$ and $A^{-1} = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$ then the value of a_{23} is

(a) 0 (b) -2 (c) -3 (d) -1

6) If A^TA^{-1} is symmetric, then A^2 =

(a) A^{-1} (b) $(A^T)^2$ (c) A^T (d) $(A^{-1})^2$

7) If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ and A(adj A) = $\begin{bmatrix} k & 0 \\ 0 & k \end{bmatrix}$ then adj (AB) is

(a) 0 (b) sin θ (c) cos θ (d) 1

8) If $A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$ be such that $\lambda A^{-1} = A$, then λ is

(a) 17 (b) 14 (c) 19 (d) 21

9) Which of the following is/are correct?

(i) Adjoint of a symmetric matrix is also a symmetric matrix.

(ii) Adjoint of a diagonal matrix is also a diagonal matrix.

(iii) If A is a square matrix of order n and λ is a scalar, then $adj(\lambda A) = \lambda^n adj(A)$.

(iv) A(adjA) = (adjA)A = |A| I

(a) Only (i) (b) (ii) and (iii) (c) (iii) and (iv) (d) (i), (ii) and (iv)

10) The augmented matrix of a system of linear equations is $\begin{bmatrix} 1 & 2 & 7 & 3 \\ 0 & 1 & 4 & 6 \\ 0 & 0 & \lambda-7 & \mu+5 \end{bmatrix}$. The system has infinitely many solutions if

(a) $\lambda = 7, \mu \neq -5$ (b) $\lambda = 7, \mu = 5$ (c) $\lambda \neq 7, \mu \neq -5$ (d) $\lambda = 7, \mu = -5$

11) If A^T is the transpose of a square matrix A, then

(a) $|A| \neq |A^T|$ (b) $|A| = |A^T|$ (c) $|A| + |A^T| = 0$ (d) $|A| = |A^T|$ only

12) If A is a square matrix that IAI = 2, than for any positive integer n, $|A^n|$ =

(a) 0 (b) 2n (c) 2^n (d) n^2

13) The system of linear equations x + y + z = 2, 2x + y - z = 3, 3x + 2y + kz = has a unique solution if

(a) $k \neq 0$ (b) $-1 < k < 1$ (c) $-2 < k < 2$ (d) k=0

14) If A is a square matrix of order n, then |adj A| =

(a) $|A|^{n-1}$ (b) $|A|^{n-2}$ (c) $|A|^n$ (d) None

15) If $A = \begin{pmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{pmatrix}$ and A(adj A) $=\lambda \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ then λ is

(a) sinx cosx (b) 1 (c) 2 (d) none

16) If A is a matrix of order m x n, then $\rho(A)$ is

(a) m (b) n (c) ≤ min (m,n) (d) ≥ min (m,n)

17) The system of equations x + 2y + 3z = 1, x - y + 4z = 0, 2x + y + 7z = 1 has

(a) One solution (b) Two solution (c) No solution (d) Infinitely many solution

18) If $\rho(A) = \rho([A/B])$ = number of unknowns, then the system is

(a) consistent and has infinitely many solutions (b) consistent (c) inconsistent (d) consistent and has unique solution

19) Which of the following is not an elementary transformation?

(a) $R_i \leftrightarrow R_j$ (b) $R_i \longrightarrow 2R_i + R_j$ (c) $C_j \longrightarrow C_j + C_i$ (d) $R_i \longrightarrow R_i + C_j$

20) Every homogeneous system ______

(a) Is always consistent (b) Has only trivial solution (c) Has infinitely many solution (d) Need not be consistent

21) If $\rho(A) \neq \rho([AIB])$, then the system is

(a) consistent and has infinitely many solutions (b) consistent and has a unique solution (c) consistent (d) inconsistent

22) In the non - homogeneous system of equations with 3 unknowns if $\rho(A) = \rho([AIB]) = 2$, then the system has _______

(a) unique solution (b) one parameter family of solution (c) two parameter family of solutions (d) in consistent

23) Cramer's rule is applicable only when ______

(a) $\Delta \neq 0$ (b) $\Delta = 0$ (c) $\Delta = 0, \Delta_x = 0$ (d) $\Delta_x = \Delta_y = \Delta_z = 0$

24) In the system of liner equations with 3 unknowns If $\rho(A) = \rho([A|B]) = 1$, the system has ________

(a) unique (b) (c) consistent with 2 (d) consistent with one solution inconsistentparameter -family of solution parameter family of solution.

25) If A is a non-singular matrix then $|A^{-1}|$ = ______

(a) $\left|\frac{1}{A^2}\right|$ (b) $\frac{1}{|A^2|}$ (c) $\left|\frac{1}{A}\right|$ (d) $\frac{1}{|A|}$

26) The area of the triangle formed by the complex numbers z,iz, and z+iz in the Argand's diagram is

(a) $\frac{1}{2}|z|^2$ (b) $|z|^2$ (c) $\frac{3}{2}|z|^2$ (d) $2|z|^2$

27) The conjugate of a complex number is $\frac{1}{i-2}$/Then the complex number is

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

28) If $\left|z-\frac{3}{z}\right|=2$ then the least value $|z|$ is

(a) 1 (b) 2 (c) 3 (d) 5

29) If $|z|=1$, then the value of $\frac{1+z}{1+\bar{z}}$ is

(a) z (b) $\bar{z}$ (c) $\frac{1}{z}$ (d) 1

30) The solution of the equation $|z|-z=1+2i$ is

(a) $\frac{3}{2}-2i$ (b) $-\frac{3}{2}+2i$ (c) $2-\frac{3}{2}i$ (d) $2+\frac{3}{2}i$

31) If $|z_1|=1, |z_2|=2|z_3|=3$ and $|9z_1z_2+4z_1z_3+z_2z_3|=12$, then the value of $|z_1+z_2+z_3|$ is

(a) 1 (b) 2 (c) 3 (d) 4

32) The principal argument of $\frac{3}{-1+i}$

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

33) If $\omega \neq 1$ is a cubic root of unity and $(1+\omega)^7 = A + B\omega$,then (A,B) equals

(a) (1,0) (b) (−1,1) (c) (0,1) (d) (1,1)

34)

If $\omega \neq 1$ is a cubic root of unity and $\begin{vmatrix} 1 & 1 & 1 \\ 1 & -\omega^2 & \omega^2 \\ 1 & \omega^2 & \omega^2 \end{vmatrix}$ =3k, then k is equal to

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

35)

If $\omega = cis\frac{2\pi}{3}$, then the number of distinct roots of $\begin{vmatrix} z+1 & \omega & \omega^2 \\ \omega & z+\omega^2 & 1 \\ \omega^2 & 1 & z+\omega \end{vmatrix}$

(a) 1 (b) 2 (c) 3 (d) 4

36) The value of (1+i) $(1+i^2)$ $(1+i^3)$ $(1+i^4)$ is

(a) 2 (b) 0 (c) 1 (d) i

37) If $\sqrt{a+ib}$ =x+iy, then possible value of $\sqrt{a-ib}$ is

(a) x^2+y^2 (b) $\sqrt{x^2+y^2}$ (c) x+iy (d) x-iy

38) If a=cosθ + i sinθ, then $\frac{1+a}{1-a}$ =

(a) cot $\frac{\theta}{2}$ (b) cot θ (c) i cot $\frac{\theta}{2}$ (d) i tan $\frac{\theta}{2}$

39)

The least positive integer n such that $\left(\frac{2i}{1+i}\right)^n$ is a positive integer is

(a) 16 (b) 8 (c) 4 (d) 2

40) If x+iy =$\frac{3+5i}{7-6i}$, they y =

(a) $\frac{9}{85}$ (b) $-\frac{9}{85}$ (c) $\frac{53}{85}$ (d) none of these

41) The amplitude of $\frac{1}{i}$ is equal to

(a) 0 (b) $\frac{\pi}{2}$ (c) $-\frac{\pi}{2}$ (d) π

42) The value of $(1+i)^4 + (1-i)^4$ is

(a) 8 (b) 4 (c) -8 (d) -4

43) If $z^n = cos\frac{n\pi}{3} + isin\frac{n\pi}{3}$, then z_1, z_2 ..... z_6 is

(a) 1 (b) -1 (c) i (d) -i

44) If x =cosθ + i sinθ, then the value of $x^n+\frac{1}{x^n}$ is

(a) 2 cosθ (b) 2i sin nθ (c) 2i sin nθ (d) 2i cos nθ

45) $\frac{(cos\theta+isin\theta)^6}{(cos\theta-isin\theta)^5}$ = ________

(a) cos 11θ - isin 11θ (b) cos 11θ + isin 11θ (c) cosθ + i sinθ (d) $cos\frac{6\theta}{5} + isin\frac{6\theta}{5}$

46) The conjugate of $\frac{1+2i}{1-(1-i)^2}$ is ______

(a) $\frac{1+2i}{1-(1-i)^2}$ (b) $\frac{5}{1-(1-i)^2}$ (c) $\frac{1-2i}{1+(1+i)^2}$ (d) $\frac{1+2i}{1+(1-i)^2}$

47) The modular of $\frac{(-1+i)(1-i)}{1+i\sqrt{3}}$ is ______

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

48) The value of $\frac{(cos45^0+isin45^0)^2(cos30^0-isin30^0)}{cos30^0+isin30^0}$ is

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

49) If $x=\cos\theta + i \sin\theta$, then $x^n+\frac{1}{x^n}$ is ______

(a) $2 \cos n\theta$ (b) $2 i \sin n\theta$ (c) $2^n \cos\theta$ (d) $2^n i \sin\theta$

50) If z_1, z_2, z_3 are the vertices of a parallelogram, then the fourth vertex z_4 opposite to z_2 is ______

(a) $z_1 + z_2 - z_2$ (b) $z_1 + z_2 - z_3$ (c) $z_1 + z_2 - z_3$ (d) $z_1 - z_2 - z_3$

51) A zero of $x^3 + 64$ is

(a) 0 (b) 4 (c) 4i (d) -4

52) If f and g are polynomials of degrees m and n respectively, and if h(x) =(f 0 g)(x), then the degree of h is

(a) mn (b) m+n (c) m^n (d) n^m

53) A polynomial equation in x of degree n always has

(a) n distinct roots (b) n real roots (c) n imaginary roots (d) at most one root

54) If α,β and γ are the roots of x^3+px^2+qx+r, then $\Sigma\frac{1}{\alpha}$ is

(a) $\frac{-q}{r}$ (b) $\frac{p}{r}$ (c) $\frac{q}{r}$ (d) $\frac{-q}{p}$

55) According to the rational root theorem, which number is not possible rational root of $4x^7+2x^4-10x^3-5$?

(a) -1 (b) $\frac{5}{4}$ (c) $\frac{4}{5}$ (d) 5

56) The polynomial x^3-kx^2+9x has three real zeros if and only if, k satisfies

(a) $|k|\le 6$ (b) k=0 (c) $|k| > 6$ (d) $|k|\ge 6$

57) The number of real numbers in [0,2π] satisfying $\sin^4x-2\sin^2x+1$ is

(a) 2 (b) 4 (c) 1 (d) ∞

58) If $x^3+12x^2+10ax+1999$ definitely has a positive zero, if and only if

(a) $a\ge 0$ (b) $a > 0$ (c) $a< 0$ (d) $a\le 0$

59) The polynomial x^3+2x+3 has

(a) one negative and two real roots (b) one positive and two imaginary roots (c) three real roots (d) no solution

60) The number of positive zeros of the polynomial $\Sigma_{j=0}^{n} n_{C_r}(-1)^r x^r$ is

(a) 0 (b) n (c) < n (d) r

61) If a, b, c ∈ Q and p +√q (p,q ∈ Q) is an irrational root of $ax^2+bx+c=0$ then the other root is
(a) -p+√q (b) p-iq (c) p-√q (d) -p-√q

62) The quadratic equation whose roots are ∝ and β is
(a) (x - ∝)(x -β) =0 (b) (x - ∝)(x + β) =0 (c) $\propto+\beta=\frac{b}{a}$ (d) $\propto.\beta=\frac{-c}{a}$

63) Ifj(x) = 0 has n roots, thenf'(x) = 0 has __________ roots
(a) n (b) n -1 (c) n+1 (d) (n-r)

64) If x is real and $\frac{x^2-x+1}{x^2+x+1}$ then
(a) $\frac{1}{3}$ ≤k≤ (b) k≥5 (c) k≤0 (d) none

65) Let a > 0, b > 0, c > 0. h n both th root of th quatlon ax^2+b+C= 0 are
(a) real and negative (b) real and positive (c) rational numb rs (d) none

66) The equation $\sqrt{x+1}-\sqrt{x-1}=\sqrt{4x-1}$ has
(a) no solution (b) one solution (c) two solution (d) more than one solution

67) lf the root of the equation $x^3 +bx^2+cx-1=0$ form an lncreasing G.P, then
(a) one of the roots is 2 (b) one of the rots is 1 (c) one of the rots is -1 (d) one of the rots is -2

68) For real x, the equation $\left|\frac{x}{x-1}\right|+|x|=\frac{x^2}{|x-1|}$ has
(a) one solution (b) two solution (c) at least two solution (d) no solution

69) If the equation ax2+ bx+c=0(a > 0) has two roots ∝ and β such that ∝< - 2 and β > 2, then
(a) b2-4ac=0 (b) b^2 - 4ac < 0 (c) b^2 - 4ac > 0 (d) b^2 - 4ac≥0

70) If $(2+\sqrt{3})x^2-2x+1+(2-\sqrt{3})x^2-2x-1=\frac{2}{2-\sqrt{3}}$ then x=
(a) 0,2 (b) 0,1 (c) 0,3 (d) 0, √3

71) If ∝, β, ɤ are the roots of the equation $x^3-3x+11=0$, then ∝+β+ɤ is __________.
(a) 0 (b) 3 (c) -11 (d) -3

72) If ∝, β,ɤ are the roots of 9x3-7x+6=0, then ∝ β ɤ is __________
(a) $\frac{-7}{9}$ (b) $\frac{7}{9}$ (c) 0 (d) $\frac{-2}{3}$

73) If x^2 - hx - 21 = 0 and x^2 - 3hx + 35 = 0 (h > 0) have a common root, then h = __________
(a) 0 (b) 1 (c) 4 (d) 3

74) If ax^2 + bx + c = 0, a, b, c E R has no real zeros, and if a + b + c < 0, then __________
(a) c > 0 (b) c< 0 (c) c=0 (d) c≥0

75) If p(x) = ax^2 + bx + c and Q(x) = -ax^2 + dx + c where ac ≠ 0 then p(x). Q(x) = 0 has at least _______ real roots.
(a) no (b) 1 (c) 2 (d) infinite

76) The value of $\sin^{-1}$ (cos x),$0 \le x \le \pi$ is
(a) $\pi-x$ (b) $x-\frac{\pi}{2}$ (c) $\frac{\pi}{2}-x$ (d) $\pi-x$

77) If $\sin^{-1} x+\sin^{-1} y=\frac{2\pi}{3}$; then $\cos^{-1}x+\cos^{-1} y$ is equal to

(a) $\frac{2\pi}{3}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{6}$ (d) π

78) $sin^{-1}\frac{3}{5} - cos^{-1}\frac{12}{13} + sec^{-1}\frac{5}{3} - cosec^{1-}\frac{13}{2}$ is equal to

(a) 2π (b) π (c) 0 (d) $\tan_{-1}\frac{12}{65}$

79) If $\sin^{-}1x = 2\sin^{-1}\alpha$ has a solution, then

(a) $|\alpha| \leq \frac{1}{\sqrt{2}}$ (b) $|\alpha| \geq \frac{1}{\sqrt{2}}$ (c) $|\alpha| < \frac{1}{\sqrt{2}}$ (d) $|\alpha| > \frac{1}{\sqrt{2}}$

80) $\sin^{-1}(\cos x) = \frac{\pi}{2} - x$ is valid for

(a) $-\pi \leq x \leq 0$ (b) $0\pi \leq x \leq 0$ (c) $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$ (d) $-\frac{\pi}{4} \leq x \leq \frac{3\pi}{4}$

81) If $\sin^{-1} x+\sin^{-1} y+\sin^{-1} z=\frac{3\pi}{2}$, the value of $x^{2017}+y^{2018}+z^{2019}-\frac{9}{x^{101}+y^{101}+z^{101}}$ is

(a) 0 (b) 1 (c) 2 (d) 3

82) If $\cot-1x=\frac{2\pi}{5}$ for some x ∈ R, the value of $\tan^{-1} x$ is

(a) $\frac{-\pi}{10}$ (b) $\frac{\pi}{5}$ (c) $\frac{\pi}{10}$ (d) $-\frac{\pi}{5}$

83) $tan^{-1}\left(\frac{1}{4}\right) + tan^{-1}\left(\frac{2}{3}\right)$ is equal to

(a) $\frac{1}{2}cos^{-1}\left(\frac{3}{5}\right)$ (b) $\frac{1}{2}sin^{-1}\left(\frac{3}{5}\right)$ (c) $\frac{1}{2}tan^{-1}\left(\frac{3}{5}\right)$ (d) $tan^{-1}\left(\frac{1}{2}\right)$

84) If the function $f(x)\sin^{-1}(x^2-3)$, then x belongs to

(a) [-1,1] (b) $[\sqrt{2},2]$ (c) $\left[-2, -\sqrt{2}\right] \cup \left[\sqrt{2}, 2\right]$ (d) $\left[-2, -\sqrt{2}\right] \cap \left[\sqrt{2}, 2\right]$

85) If $\cot^{-1} 2$ and $\cot^{-1} 3$ are two angles of a triangle, then the third angle is

(a) $\frac{\pi}{4}$ (b) $\frac{3\pi}{4}$ (c) $\frac{\pi}{6}$ (d) $\frac{\pi}{3}$

86) If $cot^{-1}\left(\sqrt{sin\alpha}\right) + tan^{-1}\left(\sqrt{sin\alpha}\right) = u$, then cos2u is equal to

(a) $\tan^2\alpha$ (b) 0 (c) -1 (d) $\tan 2\alpha$

87) If $|x| \leq 1$, then $2\tan^{-1} x-\sin^{-1} \frac{2x}{1+x^2}$ is equal to

(a) $\tan^{-1}x$ (b) $\sin^{-1}x$ (c) 0 (d) π

88) The equation $\tan^{-1} x-\cot^{-1} x=\tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$ has

(a) no solution (b) unique solution (c) two solutions (d) infinite number of solutions

89) If $\sin^{-1} x+\cot^{-1}(\frac{1}{2}) = \frac{\pi}{2}$, then x is equal to

(a) $\frac{1}{2}$ (b) $\frac{1}{\sqrt{5}}$ (c) $\frac{2}{\sqrt{5}}$ (d) $\frac{\sqrt{3}}{2}$

90) sin(tan^{-1}x), |x| < 1 ia equal to

(a) $\frac{x}{\sqrt{1-x^2}}$ (b) $\frac{1}{\sqrt{1-x^2}}$ (c) $\frac{1}{\sqrt{1+x^2}}$ (d) $\frac{x}{\sqrt{1+x^2}}$

91) If $tan^{-1}\left\{\frac{\sqrt{1+x^2}-\sqrt{1-x^2}}{\sqrt{1+x^2}+\sqrt{1-x^2}}\right\} = \alpha$ then x^2 =

(a) $sin2\alpha$ (b) $sin\alpha$ (c) $cos2\alpha$ (d) $cos\alpha$

92) If $sin^{-1}x - cos^{-1}x = \frac{\pi}{6}$ then

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{-1}{2}$ (d) none of these

93) The number of real solutions of the equation $\sqrt{1+cos2x} = 2sin^{-1}(sinx), -\pi < x < \pi$ is

(a) 0 (b) 1 (c) 2 (d) infinte

94) The value of $cos^{-1}\left(\frac{cos5\pi}{3}\right) + sin^{-1}\left(\frac{sin5\pi}{3}\right)$ is

(a) $\frac{\pi}{2}$ (b) $\frac{5\pi}{3}$ (c) $\frac{10\pi}{3}$ (d) 0

95) If $tan^{-1}\left(\frac{x+1}{x-1}\right) + tan^{-1}\left(\frac{x-1}{x}\right) = tan^{-1}(-7)$ then x Is

(a) 0 (b) -2 (c) 1 (d) 2

96) In a ΔABC if C is a right angle, then $tan^{-1}\left(\frac{a}{b+c}\right) + tan^{-1}\left(\frac{b}{c+a}\right) =$

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

97) If tan^{-1}(cotθ) = 2θ, thenθ = ____________

(a) ± 3 (b) $\pm\frac{\pi}{4}$ (c) $\pm\frac{\pi}{6}$ (d) none

98) The domain of cos^{-1}(x^2 - 4) is______

(a) [3, 5] (b) [-1, 1] (c) $\left[-\sqrt{5}, -\sqrt{3}\right] \cup \left[\sqrt{3}, \sqrt{5}\right]$ (d) [0, 1]

99) If x > 1,then $2tan^{-1}x + sin^{-1}\left(\frac{2x}{1+x^2}\right)$ ________

(a) $4\tan^{-1}x$ (b) 0 (c) $\frac{\pi}{2}$ (d) π

100) $tan^{-1}\left(tan\frac{9\pi}{8}\right)$

(a) $\frac{9\pi}{8}$ (b) $\frac{9\pi}{8}$ (c) $\frac{\pi}{8}$ (d) $\frac{-\pi}{8}$

101) The equation of the circle passing through(1,5) and (4,1) and touching y -axis is $x^2+y^2-5x-6y+9+(4x+3y-19)=0$ whereλ is equal to

(a) $0, -\frac{40}{9}$ (b) 0 (c) $\frac{40}{9}$ (d) $\frac{-40}{9}$

102) The eccentricity of the hyperbola whose latus rectum is 8 and conjugate axis is equal to half the distance between the foci is

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

103) The circle $x^2+y^2=4x+8y+5$intersects the line$3x-4y=m$ at two distinct points if

(a) $15< m < 65$ (b) $35< m < 85$ (c) $-85< m < -35$ (d) $-35< m < 15$

104) The length of the diameter of the circle which touches the x -axis at the point (1,0) and passes through the point (2,3) .

(a) $\frac{6}{5}$ (b) $\frac{5}{3}$ (c) $\frac{10}{5}$ (d) $\frac{3}{5}$

105) The radius of the circle$3x^2+by^2+4bx-6by+b^2 =0$ is

(a) 1 (b) 3 (c) $\sqrt{10}$ (d) $\sqrt{11}$

106) The centre of the circle inscribed in a square formed by the lines $x^2-8x-12=0$ and $y^2-14y+45 = 0$ is

(a) (4,7) (b) (7,4) (c) (9,4) (d) (4,9)

107) The equation of the normal to the circle $x^2+y^2-2x-2y+1=0$ which is parallel to the line
$2x+4y=3$ is

(a) $x+2y=3$ (b) $x+2y+3= 0$ (c) $2x+4y+3=0$ (d) $x-2y+3= 0$

108) If P(x, y) be any point on $16x^2+25y^2=400$ with foci F1 (3,0) and F2 (-3,0) then PF_1 PF_2 +
is

(a) 8 (b) 6 (c) 10 (d) 12

109) The radius of the circle passing through the point(6,2) two of whose diameter are$x+y=6$
and $x+2y=4$ is

(a) 10 (b) $2\sqrt{5}$ (c) 6 (d) 4

110) The ellipse E1$\frac{x^2}{9}+\frac{y^2}{4}=1$ is inscribed in a rectangle R whose sides are parallel to the coordinate axes. Another ellipse E2 passing through the point(0,4) circumscribes the

rectangle R . The eccentricity of the ellipse is

(a) $\frac{\sqrt{2}}{2}$ (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{1}{2}$ (d) $\frac{3}{4}$

111) Area of the greatest rectangle inscribed in the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$. is

(a) 2ab (b) ab (c) $\sqrt{ab}$ (d) $\frac{a}{b}$

112) An ellipse hasOB as semi minor axes, F and F′ its foci and the angle FBF′ is a right angle. Then the eccentricity of the ellipse is

(a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{2}$ (c) $\frac{1}{4}$ (d) $\frac{1}{\sqrt{3}}$

113) If the two tangents drawn from a point P to the parabolay2 = 4x are at right angles then the locus of P is

(a) 2x+1=0 (b) x = −1 (c) 2x−1=0 (d) x =1

114) The locus of a point whose distance from (-2,0) is $\frac{2}{3}$ times its distance from the line x = $\frac{-9}{2}$ is

(a) a parabola (b) a hyperbola (c) an ellipse (d) a circle

115) If the coordinates at one end of a diameter of the circle $x^2+y^2-8x-4y+c=0$ are (11,2) ,
the coordinates of the other end are

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

116) The equation of the directrix of the parabola $y^2+4y+4x+2=0$ is

(a) x = -1 (b) x = 1 (c) x = $\frac{-3}{2}$ (d) x = $\frac{3}{2}$

117) Equation of tangent at (-4, -4) on $x^2 = -4y$ is

(a) 2x - y + 4 = 0 (b) 2x + y - 4 = 0 (c) 2x - y - 12 = 0 (d) 2x + y + 4 = 0

118) The length of the latus rectum of the ellipse $\frac{x^2}{36}+\frac{y^2}{49}=1$ is

(a) $\frac{98}{6}$ (b) $\frac{72}{7}$ (c) $\frac{72}{14}$ (d) $\frac{98}{12}$

119) If the distance between the foci is 2 and the distance between the direction is 5, then the equation of the ellipse is

(a) $6x^2 + 10y^2 = 5$ (b) $6x^2 + 10y^2 = 15$ (c) $x^2 + 3y^2 = 10$ (d) none

120) The distance between the foci of a hyperbola is 16 and e = $\sqrt{2}$ Its equation is

(a) $x^2 - y^2 = 32$ (b) $y^2 - x^2 = 32$ (c) $x^2 - y^2 = 16$ (d) $y^2 - x^2 = 16$

121) The director circle of the ellipse $\frac{x^2}{9}-\frac{y^2}{5}=1$ is

(a) $x^2 + y^2 = 4$ (b) $x^2 + y^2 = 9$ (c) $x^2 + y^2 = 45$ (d) $x^2 + y^2 = 14$

122) The equation of tangent at (1, 2) to the circle $x^2 + y^2 = 5$ is

(a) x+y=3 (b) x + 2y = 3 (c) x- y= 5 (d) x - 2y = 5

123) The number of normals to the hyperbola $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ from an external point is

(a) 2 (b) 4 (c) 6 (d) 5

124) The locus of the point of Inter eetton of perpendicular tangents to the hyperbela $\frac{x^2}{16}+\frac{y^2}{9}=1$ is __________

(a) $x^2+y^2=25$ (b) $x^2+y^2=4$. (c) $x^2+y^2=3$ (d) $x^2+y^2=7$

125) The locus of the foot of perpendicular from the focus on any tangent to $y^2=4ax$ is

(a) $x^2+y^2=a^2-b^2$ (b) $x^2+y^2=a^2$ (c) $x^2+y^2=a^2-b^2$ (d) $x=0$

126) If $\vec{a}$ and $\vec{b}$ are parallel vectors, then $[\vec{a},\vec{c},\vec{b}]$ is equal to

(a) 2 (b) -1 (c) 1 (d) 0

127) If $\vec{a},\vec{b},\vec{c}$ are three unit vectors such that $\vec{a}$ is perpendicular to $\vec{b}$ and is parallel to $\vec{c}$ then $\vec{a}\times(\vec{b}\times\vec{c})$ is equal to

(a) $\vec{a}$ (b) $\vec{b}$ (c) $\vec{c}$ (d) $\vec{0}$

128) The volume of the parallelepiped with its edges represented by the vectors $\hat{i}+\hat{j},\hat{i}+2\hat{j},\hat{i}+\hat{j}+\pi\hat{k}$ is

(a) $\frac{\pi}{2}$ (b) $\frac{\pi}{3}$ (c) π (d) $\frac{\pi}{4}$

129) If $\vec{a},\vec{b},\vec{c}$ are non-coplanar, non-zero vectors such that $[\vec{a},\vec{b},\vec{c}]=3$, then $\{[\vec{a}\times\vec{b},\vec{b}\times\vec{c},\vec{c}\times\vec{a}]\}^2$ is equal to

(a) 81 (b) 9 (c) 27 (d) 18

130) If $\vec{a},\vec{b},\vec{c}$ are three non-coplanar vectors such that $\vec{a}\times(\vec{b}\times\vec{c})=\frac{\vec{b}+\vec{c}}{\sqrt{2}}$, then the angle between

(a) $\frac{\pi}{2}$ (b) $\frac{3\pi}{6}$ (c) $\frac{\pi}{4}$ (d) π

131) Distance from the origin to the plane 3x - 6y + 2z 7 = 0 is

(a) 0 (b) 1 (c) 2 (d) 3

132) If the direction cosines of a line are $\frac{1}{c},\frac{1}{c},\frac{1}{c}$, then

(a) $c=\pm 3$ (b) $c=\pm\sqrt{3}$ (c) c > 0 (d) 0 < c < 1

133) The vector equation $\vec{r}=(\hat{i}-2\hat{j}-\hat{k})+t(6\hat{i}-\hat{k})$ represents a straight line passing through the points

(a) (0,6,1)− and (1,2,1) (b) (0,6,-1) and (1,4,2) (c) (1,-2,-1) and (1,4,-2) (d) (1,-2,-1) and (0,-6,1)

134) If the planes $\vec{r}=(2\hat{i}-\lambda\hat{j}+\hat{k})=3$ and $\vec{r}=(4+\hat{j}-\mu\hat{k})=5$ are parallel, then the value of λ and μ are

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

135) If the length of the perpendicular from the origin to the plane 2x + 3y + λz =1, λ > 0 is $\frac{1}{5}$ then the value of λ is

(a) $2\sqrt{3}$ (b) $3\sqrt{2}$ (c) 0 (d) 1

136) Let $\vec{a},\vec{b}$ and $\vec{c}$ be three non- coplanar vectors and let $\vec{p},\vec{q},\vec{r}$ be the vectors defined by the relations $\vec{P} = \frac{\vec{b}\times\vec{c}}{[\vec{a}\vec{b}\vec{c}]}, \vec{q} = \frac{\vec{c}\times\vec{a}}{[\vec{a}\vec{b}\vec{c}]}, \vec{r} = \frac{\vec{a}\times\vec{b}}{[\vec{a}\vec{b}\vec{c}]}$ Then the value of

$(\vec{a}+\vec{b}).\vec{p} + (\vec{b}+\vec{c}).\vec{q} + (\vec{c}+\vec{a}).\vec{r} =$

(a) 0 (b) 1 (c) 2 (d) 3

137) The volume of the parallelepiped whose sides are given by $\vec{OA} = 2\hat{i} - 3\hat{j}$, $\vec{OB} = \hat{i} + \hat{j} - \hat{k}$ and $\vec{OC} = 3\hat{i} - \hat{k}$ is

(a) $\frac{4}{13}$ (b) 4 (c) $\frac{2}{7}$ (d) $\frac{4}{9}$

138) If $|\vec{a}| = |\vec{b}| = 1$such that $\vec{a}+2\vec{b}$ and $5\vec{a}-\vec{b}$ are perpendicular to each other, then the angle between $\vec{a}$ and $\vec{b}$ is

(a) 45° (b) 60° (c) $\cos^{-1}\left(\frac{1}{3}\right)$ (d) $\cos^{-1}\left(\frac{2}{7}\right)$

139) The angle between the vector $3\hat{i} + 4\hat{j} + 5\hat{k}$ and the z-axis is

(a) 30° (b) 60° (c) 45° (d) 90°

140) If θ is the angle between the vectors $\vec{a}$ and $\vec{b}$, then sinθ is

(a) $\frac{\vec{a}.\vec{b}}{|\vec{a}||\vec{b}|}$ (b) $\frac{|\vec{a}\times\vec{b}|}{\vec{a}.\vec{b}}$ (c) $\sqrt{1-\left(\frac{\vec{a}.\vec{b}}{|\vec{a}||\vec{b}|}\right)^2}$ (d) 0

141) If the vector $\hat{i} + \hat{j} + 2\hat{k}$, $-\hat{i} + 2\hat{k}$ and $2\hat{i} + x\hat{j} - y\hat{k}$ are mutually orthogonal, then the values of x, y, z are

(a) (10, 4, 1) (b) (-10, 4, 1) (c) (-10, -4, $\frac{1}{2}$) (d) (-10, 4, $\frac{1}{2}$)

142) The value of $|\vec{a}+\vec{b}|^2 + |\vec{a}-\vec{b}|^2$ is

(a) $2\left(|\vec{a}|^2 + |\vec{b}|^2\right)$ (b) $4\ \vec{a}.\vec{b}$ (c) $2\left(|\vec{a}|^2 - |\vec{b}|^2\right)$ (d) $4\ |\vec{a}|^2|\vec{b}|^2$

143) The straight lines $\frac{x-3}{2} = \frac{y+5}{4} = \frac{z-1}{-13}$ and $\frac{x+1}{3} = \frac{y-4}{5} = \frac{z+2}{2}$ are

(a) parallel (b) perpendicular (c) inclined at 45° (d) none

144) If the vectors $a\hat{i} + \hat{j} + \hat{k}$, $\hat{i} + b\hat{j} + \hat{k}$ and $\hat{i} + \hat{j} + c\hat{k}$ (a ≠ b ≠ c ≠ 1) are coplaner, then $\frac{1}{1-a} + \frac{1}{1-b} + \frac{1}{1-c} =$

(a) 0 (b) 1 (c) 2 (d) $\frac{abc}{(1-a)(1-b)(1-c)}$

145) The angle between the planes 2x + y - z = 9 and x + 2y + z = 7 is____________

(a) $\cos^{-1}(5/6)$ (b) $\cos^{-1}(5/36)$ (c) $\cos^{-1}(1/2)$ (d) $\cos^{-1}(1/12)$

146) The angle between the vectors $\hat{i}-\hat{j}$ and $\hat{j}-\hat{k}$ is ______________

(a) $\frac{\pi}{3}$ (b) $\frac{-2\pi}{3}$ (c) $\frac{-\pi}{3}$ (d) $\frac{2\pi}{3}$

147) The unit normal vectors to the plane 2x - y + 2z = 5 are _______________

(a) $2\hat{i}-\hat{j}+2\hat{k}$ (b) $\frac{1}{3}\left(2\hat{i}-\hat{j}+2\hat{k}\right)$ (c) $-\frac{1}{3}\left(2\hat{i}-\hat{j}+2\hat{k}\right)$ (d) $\pm\frac{1}{3}\left(2\hat{i}-\hat{j}+2\hat{k}\right)$

148) If $\vec{a},\vec{b},\vec{c}$ are mutually $\perp^r$ unit vectors, then $\left|\vec{a}+\vec{b}+\vec{c}\right|$ is _______________

(a) 3 (b) 9 (c) $3\sqrt{3}$ (d) $\sqrt{3}$

149) The length of the $\perp^r$ from the origin to plane $\vec{r}.\left(3\hat{i}+4\hat{j}+12\hat{k}\right)$= 26 is _____________

(a) 2 (b) $\frac{1}{2}$ (c) 26 (d) $\frac{26}{169}$

150) If $\left|\vec{a}\times\vec{b}\right| = \vec{a}.\vec{b}$, then the angle between the vector $\vec{a}$ and $\vec{b}$ is _____________

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{6}$ (d) $\frac{\pi}{2}$

****

1) (c) I

2) (b) $\frac{1}{9}$

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

4) (d) $2A^{-1}$

5) (d) -1

6) (b) $(A^T)^2$

7) (d) 1

8) (c) 19

9) (d) (i), (ii) and (iv)

10) (d) $\lambda = 7, \mu = -5$

11) (b) $|A| = |A^T|$

12) (a) 0

13) (a) $k \neq 0$

14)
(a) $|A|^{n-1}$
15)
(b) 1
16)
(c) $\leq \min(m,n)$
17)
(d) Infinitely many solution
18)
(d) consistent and has unique solution
19)
(d) $R_i \longrightarrow R_i + C_j$
20)
(a) Is always consistent
21)
(d) inconsistent
22)
(b) one parameter family of solution
23)
(a) $\Delta \neq 0$
24)
(c) consistent with 2 parameter -family of solution
25)
(d) $\frac{1}{|A|}$
26)
(a) $\frac{1}{2}|z|^2$
27)
(b) $\frac{-1}{i+2}$
28)
(a) 1
29)
(a) z
30)
(a) $\frac{3}{2} - 2i$
31)
(b) 2
32)

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

33)

(d) (1,1)

34)

(d) $-\sqrt{3i}$

35)

(a) 1

36)

(b) 0

37)

(d) x-iy

38)

(c) i cot $\frac{\theta}{2}$

39)

(b) 8

40)

(c) $\frac{53}{85}$

41)

(c) -$\frac{\pi}{2}$

42)

(c) -8

43)

(b) -1

44)

(a) 2 cosθ

45)

(b) cos 11θ + isin 11θ

46)

(b) $\frac{5}{1-(1-i)^2}$

47)

(c) 1

48)

(d) $\frac{\sqrt{3}}{2}+\frac{1}{2}$

49)

(a) 2 cos nθ

50)

(a) $z_1 + z_2 - z_2$

51)

(d) -4
52)
(a) mn
53)
(a) n distinct roots
54)
(a) $-\frac{q}{r}$
55)
(b) $\frac{5}{4}$
56)
(d) |k|≥6
57)
(a) 2
58)
(c) a<0
59)
(a) one negative and two real roots
60)
(b) n
61)
(c) p-√q
62)
(a) (x - ∝)(x -β) =0
63)
(b) n -1
64)
(a) $\frac{1}{3}$ ≤k≤
65)
(b) real and positive
66)
(a) no solution
67)
(b) one of the rots is 1
68)
(c) at least two solution
69)
(c) b^2 - 4ac >0
70)
(a) 0,2
71)
(a) 0
72)

(d) $\frac{-2}{3}$

73)

(c) 4

74)

(b) c<0

75)

(c) 2

76)

(c) $\frac{\pi}{2}-x$

77)

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

78)

(c) 0

79)

(a) $|\alpha| \leq \frac{1}{\sqrt{2}}$

80)

(b) $0\pi \leq x \leq 0$

81)

(a) 0

82)

(c) $\frac{\pi}{10}$

83)

(d) $tan^{-1}\left(\frac{1}{2}\right)$

84)

(c) $\left[-2, -\sqrt{2}\right] \cup \left[\sqrt{2}, 2\right]$

85)

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

86)

(c) -1

87)

(c) 0

88)

(b) unique solution

89)

(b) $\frac{1}{\sqrt{5}}$

90)

(d) $\frac{x}{\sqrt{1+x^2}}$

91)

(a) $sin2\alpha$

92)

(b) $\frac{\sqrt{3}}{2}$

93)

(a) 0

94)

(d) 0

95)

(d) 2

96)

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

97)

(c) $\pm\frac{\pi}{6}$

98)

(c) $\left[-\sqrt{5}, -\sqrt{3}\right] \cup \left[\sqrt{3}, \sqrt{5}\right]$

99)

(d) π

100)

(c) $\frac{\pi}{8}$

101)

(a) $0, -\frac{40}{9}$

102)

(c) $\frac{2}{\sqrt{3}}$

103)

(d) $-35<m<15$

104)

(c) $\frac{10}{5}$

105)

(c) $\sqrt{10}$

106)
(a) (4,7)
107)
(a) x+2y=3
108)
(c) 10
109)
(b) $2\sqrt{5}$
110)
(c) $\frac{1}{2}$
111)
(a) 2ab
112)
(a) $\frac{1}{\sqrt{2}}$
113)
(b) $x = -1$
114)
(c) an ellipse
115)
(b) (2,-5)
116)
(d) $x = \frac{3}{2}$
117)
(a) $2x - y + 4 = 0$
118)
(b) $\frac{72}{7}$
119)
(b) $6x^2 + 10y^2 = 15$
120)
(c) $x^2 - y^2 = 16$
121)
(d) $x^2 + y^2 = 14$
122)
(b) $x + 2y = 3$
123)
(d) 5
124)
(d) $x^2+y^2=7$
125)
(d) $x = 0$
126)

(d) 0

127)

(b) $\vec{b}$

128)

(c) π

129)

(a) 81

130)

(b) $\frac{3\pi}{6}$

131)

(b) 1

132)

(b) $c = \pm\sqrt{3}$

133)

(c) (1,-2,-1) and (1,4,-2)

134)

(c) $-\frac{1}{2}, -2$

135)

(a) $2\sqrt{3}$

136)

(d) 3

137)

(b) 4

138)

(b) 60°

139)

(c) 45°

140)

(c) $\sqrt{1-\left(\frac{\vec{a}.\vec{b}}{|\vec{a}|\,|\vec{b}|}\right)^2}$

141)

(d) (-10, 4, $\frac{1}{2}$)

142)

(a) $2\left(|\vec{a}|^2+|\vec{b}|^2\right)$

143)

(b) perpendicular

144)

(b) 1

145)

(c) $\cos^{-1}(1/2)$

146)

(d) $\frac{2\pi}{3}$

147)

(d) $\pm\frac{1}{3}\left(2\hat{i}-\hat{j}+2\hat{k}\right)$

148)

(d) $\sqrt{3}$

149)

(a) 2

150)

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