

CLASS XII – MATHEMATICS – CHAPTER 04

DETERMINANTS

Name: _____

Date: _____

Q01. Find values of x for which $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$.

Q02. A be a square matrix of order 3*3, there is |KA| equal to _____.

Q03. Evaluate $\Delta = \begin{vmatrix} 3 & 2 & 3 \\ 2 & 2 & 3 \\ 3 & 2 & 3 \end{vmatrix}$

Q04. Let $\begin{vmatrix} 4 & y \\ x & 1 \end{vmatrix} = \begin{vmatrix} 4 & 2 \\ 4 & 1 \end{vmatrix}$. Find all the possible value of x and y if x and y are natural numbers.

Q05. Solve $\begin{vmatrix} x^2 - x + 1 & x + 1 \\ x + 1 & x + 1 \end{vmatrix}$.

Q06. Find minors and cofactors of all the elements of the det. $\begin{vmatrix} 1 & -2 \\ 4 & 3 \end{vmatrix}$.

Q07. Evaluate $\begin{vmatrix} 102 & 18 & 36 \\ 1 & 3 & 4 \\ 17 & 3 & 6 \end{vmatrix}$.

Q08. Show that $\begin{vmatrix} \sin 10^\circ & -\cos 10^\circ \\ \sin 80^\circ & \cos 80^\circ \end{vmatrix} = 1$.

Q09. Find value of x, if $\begin{vmatrix} 2 & 4 \\ 5 & 1 \end{vmatrix} = \begin{vmatrix} 2x & 4 \\ 6 & x \end{vmatrix}$.

Q10. Find adj A for $A = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$.

Q11. If matrix $A = \begin{bmatrix} 1 & -2 & 3 \\ 1 & 2 & 1 \\ x & 2 & -3 \end{bmatrix}$ is singular. Find X.

Q12. Q16. If $\begin{vmatrix} x & 2 \\ 18 & x \end{vmatrix} = \begin{vmatrix} 6 & 2 \\ 18 & 6 \end{vmatrix}$, than x is equal to _.

Q13. $A = \begin{bmatrix} 1 & 2 \\ 1 & 4 \end{bmatrix}$ is singular or not.

Q14. $A = \begin{bmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{bmatrix}$. Verify that $\det. A = \det(A')$.

Q15. If $A = A = \begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix}$, then show that $|2A| = 4|A|$

Q16. A be a non – singular square matrix of order 3 ´3. Then |adj A| is equal to?

Q17. If A is an invertible matrix of order 2, then det is equal (A⁻¹) to?

Q18. B = [-7] find det B = [1]

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Q19.
$$\begin{vmatrix} (y+z)^2 & xy & zx \\ xy & (x+z)^2 & yz \\ xz & yz & (x+z)^2 \end{vmatrix} = 2xyz(x+y+z)^3.$$

Q20. Find the equation of line joining (3, 1) and (9, 3) using determinants.

Q21. If $A = \begin{bmatrix} 2 & 3 \\ 1 & -4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 \\ -1 & 3 \end{bmatrix}$ then verify that $(AB)^{-1} = B^{-1}A^{-1}$

Q22. Using cofactors of elements of third column, evaluate $\Delta = \begin{vmatrix} 1 & x & yz \\ 1 & y & zx \\ 1 & z & xy \end{vmatrix}.$

Q23. If $A = \begin{bmatrix} 2 & -3 & 5 \\ 3 & 2 & -4 \\ 1 & 1 & -2 \end{bmatrix}$. Find A^{-1} , using A^{-1} solve the system of equations

$$2x - 3y + 5z = 11.; \quad 3x + 2y - 4z = -5.; \quad x + y - 2z = -3.$$

Q24. $\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$. Verify that $a_{11}A_{31} + a_{12}A_{32} + a_{13}A_{33} = 0$.

Q25. If $A = \begin{bmatrix} 3 & -4 \\ -1 & 2 \end{bmatrix}$, find matrix B such that $AB = I$.

Q26. Using matrices solve the following system of equation

$$\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4; \quad \frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1; \quad \frac{6}{x} + \frac{9}{y} + \frac{-20}{z} = 2$$

Q27. Given $A = \begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix}$ find AB and use this result in solving the

following system of equation. $x - y + z = 4;$ $x - 2y - 2z = 9;$ $2x + y + 3z = 1$

Q28. Use produce $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix} \begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2 \end{bmatrix}$. To solve the system of equations.

$$x - y + 2z = 1; \quad 2y - 3z = 1; \quad 3x - 2y + 4z = 2$$

Q29. If a, b, c is in A. P. then find the value of $\begin{vmatrix} x+2 & x+3 & x+2a \\ x+3 & x+4 & x+2b \\ x+4 & x+5 & x+2c \end{vmatrix}.$

Q30. $A = \begin{bmatrix} 3 & 2 \\ 1 & 1 \end{bmatrix}$, Find the no. a and b such that $A^2 + aA + bI = 0$ Hence find A^{-1} .

Q31. Find the area of Δ whose vertices are (3, 8) (-4, 2) and (5, 1)

Q32. Evaluate $\Delta = \begin{bmatrix} 0 & \sin\alpha & -\cos\alpha \\ -\sin\alpha & 0 & \sin\beta \\ \cos\alpha & -\sin\beta & 0 \end{bmatrix}$

Q33. Solve by matrix method

$$x - y + z = 4; \quad 2x + y - 3z = 0; \quad x + y + z = 2$$

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Q34. If x, y, z are different and $\Delta = \begin{vmatrix} x & x^2 & 1 + x^3 \\ y & y^2 & 1 + y^3 \\ z & z^2 & 1 + z^3 \end{vmatrix} = 0$ then show that $1 + xyz = 0$.

Q35. Find the equation of the line joining A (1, 3) and B (0, 0) using det. Find K if D (K, 0) is a point such then area of ΔABC is 3 square unit.

Q36. Show that the matrix $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$ satisfies the equation $A^2 - 4A + I = 0$. Using this equation, find A^{-1} .

Q37. Solve by matrix method.

$$3x - 2y + 3z = 8; \quad 2x + y - z = 1; \quad 4x - 3y + 2z = 4$$

Q38. The sum of three no. is 6. If we multiply third no. by 3 and add second no. to it, we get 11. By adding first and third no. we get double of the second no. represent it algebraically and find the no. using matrix method.

Q39. $\begin{vmatrix} \alpha & \alpha^2 & \beta - \gamma \\ \beta & \beta^2 & \gamma + \alpha \\ \gamma & \gamma^2 & \alpha + \beta \end{vmatrix} = (\beta - \gamma)(\gamma - \alpha)(\alpha - \beta)(\alpha + \beta + \gamma)$.

Q40. Find values of K if area of Δ is 35 square unit and vertices are (2, -6), (5, 4), (K, 4).

Q41. Using cofactors of elements of second row, evaluate $\Delta = \begin{vmatrix} 5 & 3 & 8 \\ 2 & 0 & 1 \\ 1 & 2 & 3 \end{vmatrix}$.

Q42. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$. Show that $A^2 - 5A + 7I = 0$. Using this equation, find A^{-1} .

Q43. The cost of 4kg onion, 3kg wheat and 2kg rice is Rs. 60. The cost of 2kg onion, 4kg wheat and 6kg rice is Rs. 90. The cost of 6kg onion 2kg wheat and 3kg rice is Rs. 70. Find the cost of each item per kg by matrix method.