

National Institute of Open Schooling (NIOS)
Senior Secondary Course-Mathematics
Lesson – 21: Determinants
Worksheet – 21

1. Write any one determinant of order 3 and expand it as per rule of expansion of determinant.
2. Differentiate determinants from Matrices. Write system of linear equations and expanded to its determinant form.
3. Using the properties of determinant prove that :

$$\begin{vmatrix} a+b & b+c & c+a \\ b+c & c+a & a+b \\ c+a & a+b & b+c \end{vmatrix} = 2 \begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$$

4. Write any one determinant of order 2. Find the minors and cofactors of the determinant.
5. Explain any two properties of determinant with examples.
6. Using the properties of determinant prove that :

$$\begin{vmatrix} 1 & x+y & x^2+y^2 \\ 1 & y+z & y^2+z^2 \\ 1 & z+x & z^2+x^2 \end{vmatrix} = (x-y)(y-z)(z-x)$$

7. Identify specific condition of determinants where the determinant values become Zero. Justify with an example of determinant.
8. Using determinant find out the area of a triangle ABC with vertices A (4,-5), B (2,5), and C (-6,-3). Also check the area of triangle ABC by using Hero's formula and write your observations.
9. Show that three points (x, y +z), (y, z +x) and (z, x +y) on the plane are collinear by using determinant.
10. Find the value of x by using different properties of determinant :

$$\begin{vmatrix} 3x-8 & 3 & 3 \\ 3 & 3x-8 & 3 \\ 3 & 3 & 3x-8 \end{vmatrix} = 0$$