INTERNATIONAL INDIAN SCHOOL, RIYADH

FIRST - TERM WORKSHEET

CHAPTER 4 – DETERMINANTS

1. If for matrix A , |A| = 3, find |5A| where A is of order 2×2
2. A is a non-singular matrix of order 3 and |A| = -4, find |adj A |
3. Given A is of order 3×3 and |A| = 12, find |A. Adj A |
4. If A = $\begin{bmatrix} 1 & tanx \\ -tanx & 1 \end{bmatrix}$, show that A^1A^{-1} = $\begin{matrix} Cos\ 2x & -Sin\ 2x \\ Sin\ 2x & Cos\ 2x \end{matrix}$
5. Prove using properties of determinants

   $$\begin{vmatrix} y+z & x & y \\ z+x & z & x \\ x+y & y & z \end{vmatrix} = (x+y+z)\ (x-z)^2$$
6. Find the value of $\frac{p}{p-a} + \frac{q}{q-b} + \frac{r}{r-c}$ given $\begin{vmatrix} p & b & c \\ a & q & c \\ a & b & r \end{vmatrix} = 0$
7. Prove that $\begin{vmatrix} b+c & a-b & a \\ c+a & b-c & b \\ a+b & c-a & c \end{vmatrix} = 3abc - a^3 - b^3 - c^3$
8. Prove that $\begin{vmatrix} a+b+c & -c & -b \\ -c & a+b+c & -a \\ -b & -a & a+b+c \end{vmatrix} = 2(a+b)(b+c)(c+a)$
9. Prove using properties of determinants

   $$\begin{vmatrix} a^2+2a & 2a+1 & 1 \\ 2a+1 & a+2 & 1 \\ 3 & 3 & 1 \end{vmatrix} = (a-1)^3$$

10. Use the product $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}\begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2 \end{bmatrix}$ to solve the system of equations x – y + 2z = 1 ; 2y – 3z = 1 ; 3x – 2y + 4z = 2

11. Without expanding show that

$$\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix} = 4abc$$

12. Show that the points A(a, b+c), B(b, c+a) and C(c, a+b) are collinear

13. Find the value of θ satisfying $\begin{vmatrix} 1 & 1 & Sin3\theta \\ -4 & 3 & Cos2\theta \\ 7 & -7 & 2 \end{vmatrix} = 0$

14. Find equation of the line joining (1,2) and (3,6) using determinants.

15. Using matrices, solve x – y + 2z = 7 ; 3x + 4y – 5z = – 5 ; 2x – y + 3z = 12

16. Show that A = $\begin{vmatrix} 3 & 1 \\ -1 & 2 \end{vmatrix}$ satisfies A2 – 5A + 7I = 0. Hence find A^{-1}

17. Let A = $[a_{ij}]_{n\times n}$. Write |2A| where |A| = 4 and n = 3.

18. For what value of x, $\begin{bmatrix} 5-x & x+1 \\ 2 & 4 \end{bmatrix}$ is singular.

19. If A = $\begin{vmatrix} 1 & x & x^2 \\ 1 & y & y^2 \\ 1 & z & z^2 \end{vmatrix}$ and A_1 = $\begin{vmatrix} 1 & 1 & 1 \\ yx & zx & xy \\ x & y & z \end{vmatrix}$ show that A + A_1 = 0

20. If a, b, c are in A.P , then find the value of

$$\begin{vmatrix} 2y+4 & 5y+7 & 8y+a \\ 3y+5 & 6y+8 & 9y+b \\ 4y+6 & 7y+9 & 10y+c \end{vmatrix}$$