

Chapter 6 Determinants Ex 6.2 Q41

$$LHS = \begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+a & 1 \\ 1 & 1 & 1+a \end{vmatrix}$$

$$= \begin{vmatrix} 3+a & 3+a & 3+a \\ 1 & 1+a & 1 \\ 1 & 1 & 1+a \end{vmatrix}$$

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

$$= (3+a)\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 0 & a & 0 \\ 0 & 1 & a \end{vmatrix}$$

$$= (3+a)a^{2}$$

$$= a^{3} + 3a^{2}$$

$$= RHS$$

Chapter 6 Determinants Ex 6.2 Q42

L.H.S.,
$$\begin{vmatrix} 2y & y-z-x & 2y \\ 2z & 2z & z-x-y \\ x-y-z & 2x & 2x \end{vmatrix}$$

$$= \begin{vmatrix} x+y+z & x+y+z & x+y+z \\ 2z & 2z & z-x-y \\ x-y-z & 2x & 2x \end{vmatrix} \begin{bmatrix} R_1 = R_1 + R_2 + R_3 \end{bmatrix}$$

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

$$= (x+y+z) \begin{vmatrix} 1 & 0 & 0 \\ 2z & 0 & -x-y-z \\ x-y-z & x+y+z & x+y+z \end{vmatrix} \begin{bmatrix} C_2 = C_2 - C_1, C_3 = C_3 - C_1 \end{bmatrix}$$

$$= (x+y+z) [1\{0+(x+y+z)(x+y+z)\}]$$

$$= (x+y+z)^3$$
= R.H.S.
Hence Proved

Chapter 6 Determinants Ex 6.2 Q43

$$\begin{vmatrix} y + z & x & y \\ z + x & z & x \\ x + y & y & z \end{vmatrix}$$

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

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

$$= (x + y + z) \begin{vmatrix} 0 & 1 & 1 \\ z + x - z - x & z & x \\ x + y - y - z & y & z \end{vmatrix}$$

$$= (x + y + z) \begin{vmatrix} 0 & 1 & 1 \\ 0 & z & x \\ x - z & y & z \end{vmatrix}$$

$$= (x + y + z)(x - z)^{2}$$

$$= RHS$$

Chapter 6 Determinants Ex 6.2 Q44

Hence Proved.

$$\begin{vmatrix} a+x & y & z \\ x & a+y & z \\ x & y & a+z \end{vmatrix}$$

$$= \begin{vmatrix} a+x+y+z & y & z \\ a+x+y+z & a+y & z \\ a+x+y+z & x & a+z \end{vmatrix}$$

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

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

$$= (a+x+y+z)\begin{bmatrix} 1 & y & z \\ 0 & a & 0 \\ 0 & x-y & a \end{vmatrix}$$

$$= (a+x+y+z)[1(a^2-0)]$$

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

$$= R.H.S.$$

********* END ********