Determinants Ex 6.1 Q2(i)

$$\text{Let } A = \begin{vmatrix} x & -7 \\ x & 5x + 1 \end{vmatrix}$$

$$|A| = x(5x + 1) + 7 \times x$$

$$= 5x^2 + x + 7x$$

$$= 5x^2 + 8x$$

$$\text{Hence } |A| = 5x^2 + 8x$$

Determinants Ex 6.1 Q2(ii)

Let $A = \begin{vmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{vmatrix}$

$|A| = \cos\theta \times \cos\theta + \sin\theta \times \sin\theta$

$\qquad = \cos^2\theta + \sin^2\theta$

$\qquad = 1$

Hence $|A| = 1$

Determinants Ex 6.1 Q2(iii)

Let $A = \begin{vmatrix} \cos 15° & \sin 15° \\ \sin 75° & \cos 75° \end{vmatrix}$

$|A| = \cos 15° \cos 75° - \sin 15° \sin 75°$

$\qquad = \cos(75 + 15)$ $\qquad\qquad (\because \cos A \cos B - \sin A \sin B = \cos(A+B))$

$\qquad = \cos 90°$

$\qquad = 0$

Hence $|A| = 0$

Determinants Ex 6.1 Q2(iv)

Let $A = \begin{vmatrix} a+ib & c+id \\ -c+id & a-ib \end{vmatrix}$

$|A| = (a+ib)(a-ib) - (c+id)(-c+id)$

$\qquad = (a^2 + b^2) + (c+id)(c - id)$ $\qquad (\text{Taking} (-) \text{ sign common from} -c+id)$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad (\text{Also } (a+ib)(a-ib) = a^2 + b^2)$

$= a^2 + b^2 + c^2 + d^2$

Hence $|A| = a^2 + b^2 + c^2 + d^2$

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