



Determinants Ex 6.1 Q2(i)

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

$$\begin{aligned} |A| &= x(5x + 1) + 7 \times x \\ &= 5x^2 + x + 7x \\ &= 5x^2 + 8x \end{aligned}$$

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

Determinants Ex 6.1 Q2(ii)

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

$$\begin{aligned} |A| &= \cos \theta \times \cos \theta + \sin \theta \times \sin \theta \\ &= \cos^2 \theta + \sin^2 \theta \\ &= 1 \end{aligned}$$

$$\text{Hence } |A| = 1$$

Determinants Ex 6.1 Q2(iii)

$$\text{Let } A = \begin{vmatrix} \cos 15^\circ & \sin 15^\circ \\ \sin 75^\circ & \cos 75^\circ \end{vmatrix}$$

$$\begin{aligned} |A| &= \cos 15^\circ \cos 75^\circ - \sin 15^\circ \sin 75^\circ \\ &= \cos (75 + 15) && (\because \cos A \cos B - \sin A \sin B = \cos (A + B)) \\ &= \cos 90^\circ \\ &= 0 \end{aligned}$$

$$\text{Hence } |A| = 0$$

Determinants Ex 6.1 Q2(iv)

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

$$\begin{aligned} |A| &= (a + ib)(a - ib) - (c + id)(-c + id) \\ &= (a^2 + b^2) + (c + id)(c - id) && \text{(Taking } (-) \text{ sign common from } -c + id) \\ & && \text{(Also } (a + ib)(a - ib) = a^2 + b^2) \\ &= a^2 + b^2 + c^2 + d^2 \end{aligned}$$

$$\text{Hence } |A| = a^2 + b^2 + c^2 + d^2$$

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