Related Problem with solution :

Q)

If $A = \begin{bmatrix} 1 & 2 \\ 4 & 2 \end{bmatrix}$, then show that $|2A| = 4|A|$

Soln :

The given matrix is $A = \begin{bmatrix} 1 & 2 \\ 4 & 2 \end{bmatrix}$

Therefore,

$$2A = 2\begin{pmatrix} 1 & 2 \\ 4 & 2 \end{pmatrix}$$

$$= \begin{pmatrix} 2 & 4 \\ 8 & 4 \end{pmatrix}$$

Hence,

$$LHS = |2A|$$

$$= \begin{vmatrix} 2 & 4 \\ 8 & 4 \end{vmatrix}$$

$$= 2 \times 4 - 4 \times 8$$

$$= 8 - 32$$

$$= -24$$

Now,

$$|A| = \begin{vmatrix} 1 & 2 \\ 4 & 2 \end{vmatrix} = 1 \times 2 - 2 \times 4$$

$$= 2 - 8$$

$$= -6$$

Therefore,

$$RHS = 4|A|$$

$$= 4(-6)$$

$$= -24$$

Thus, $|2A| = 4|A|$ proved.