

2017

217-148

AUGUST
SATURDAY

05

06.) Product of two Pauli

$$\sigma_i \sigma_j = \delta_{ij} I + i \sum_k \epsilon_{ijk} \sigma_k$$

Verify the identity for these cases

a) $\sigma_x \sigma_y$ LHS

$$\sigma_x = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$$

the above id.

$$\sigma_y = \begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}$$

$$\sigma_x \sigma_y = \begin{pmatrix} 0 & 0 \\ 0 & -i \end{pmatrix}$$

$$\sigma_z = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$$

and the RHS

$$\delta_{12} I_{2 \times 2} + i \sum_3 \epsilon_{123} \sigma_3$$

$$I_{2 \times 2} + i \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} \Rightarrow \begin{pmatrix} 1 & 0 \\ 0 & -i \end{pmatrix}$$

$$\text{LHS} = \text{RHS} \quad (\text{verified})$$

SUNDAY

06

2017 SEPTEMBER

Mon	4	11	18	25
Tue	5	12	19	26
Wed	6	13	20	27
Thu	7	14	21	28
Fri	1	8	15	22
Sat	2	9	16	23
Sun	3	10	17	24

07

AUGUST
MONDAY20
WK 32

$$2) \sigma_y \sigma_z = \begin{pmatrix} 0 & i \\ i & 0 \end{pmatrix}$$

$$\delta_{23} I_{2 \times 2} + i \sum e_{231} \sigma_1$$

$$+ i \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$$

$$\begin{pmatrix} 0 & i \\ i & 0 \end{pmatrix} = \begin{pmatrix} 0 & i \\ i & 0 \end{pmatrix} \quad \text{verified}$$

$$3) \sigma_x \sigma_z = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$$

$$\delta_{13} I_{2 \times 2} + i \sum e_{132} \sigma_2$$

$$i \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}$$

$$= \begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$$

$$\text{LHS} = \text{RHS} \quad \text{Verified}$$