

$$\Rightarrow \text{Let } A+2B = \begin{bmatrix} 1 & 2 & 5 \\ 6 & -3 & 6 \\ -5 & 3 & 1 \end{bmatrix} \text{ and } 2A-B = \begin{bmatrix} 2 & -1 & 5 \\ 2 & -1 & 6 \\ 0 & 1 & 2 \end{bmatrix}. \text{ If}$$

$\text{Tr}(A)$  denotes the sum of all diagonal elements of the matrix  $A$ , then  $\text{Tr}(A) - \text{Tr}(B)$  has value equal to:

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- (a) 1      (b) 3      (c) 0      (d) 2

$$(d) \Rightarrow A = \frac{1}{5} (A+2B) + 2(2A-B)$$

$$= \frac{1}{5} \left( \begin{bmatrix} 1 & 2 & 5 \\ 6 & -3 & 6 \\ -5 & 3 & 1 \end{bmatrix} + \begin{bmatrix} 4 & -2 & 10 \\ 4 & -2 & 12 \\ 0 & 2 & 4 \end{bmatrix} \right) = \frac{1}{5} \begin{bmatrix} 5 & 0 & 15 \\ 10 & -5 & 15 \\ -5 & 5 & 5 \end{bmatrix}$$

In the same way, so  $\text{tr}(A) = 1$

$$B = \frac{1}{5} (2(A+2B) - (2A-B))$$

$$= \frac{1}{5} \left( \begin{bmatrix} 2 & 4 & 0 \\ 12 & -6 & 6 \\ -10 & 6 & 2 \end{bmatrix} - \begin{bmatrix} 2 & -1 & 5 \\ 2 & -1 & 6 \\ 0 & 1 & 2 \end{bmatrix} \right)$$

$$\text{So, } \text{tr}(B) = -1$$

$$\text{Now, } \text{Tr}(A) - \text{Tr}(B) = 1 - (-1) = 2$$