

→ If  $A = \begin{bmatrix} 1 & 2 & x \\ 3 & -1 & 2 \end{bmatrix}$  and  $B = \begin{bmatrix} y \\ x \\ 1 \end{bmatrix}$  be such that  $AB = \begin{bmatrix} 6 \\ 8 \end{bmatrix}$  then

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- (a)  $y = 2x$    (b)  $y = -2x$    (c)  $y = x$    (d)  $y = -x$

solution: (a) Let  $A = \begin{bmatrix} 1 & 2 & x \\ 3 & -1 & 2 \end{bmatrix}$  and  $B = \begin{bmatrix} y \\ x \\ 1 \end{bmatrix}$

$$AB = \begin{bmatrix} 1 & 2 & x \\ 3 & -1 & 2 \end{bmatrix} \begin{bmatrix} y \\ x \\ 1 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} 6 \\ 8 \end{bmatrix} = \begin{bmatrix} y + 2x + x \\ 3y - x + 2 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} 6 \\ 8 \end{bmatrix} = \begin{bmatrix} y + 3x \\ 3y - x + 2 \end{bmatrix}$$

$$\Rightarrow y + 3x = 6 \quad \text{and} \quad 3y - x = 6$$

on solving, we get

$$x = \frac{6}{5} \quad \text{and} \quad y = \frac{12}{5}$$

$$\Rightarrow y = 2x$$