**Example 6** Express the matrix A as the sum of a symmetric and a skew symmetric matrix, where

matrix, where
$$A = \begin{bmatrix} 2 & 4 & -6 \\ 7 & 3 & 5 \\ 1 & -2 & 4 \end{bmatrix}.$$

Example 7 If  $A = \begin{bmatrix} 1 & 3 & 2 \\ 2 & 0 & -1 \\ 1 & 2 & 3 \end{bmatrix}$ , then show that A satisfies the equation

Find the matrix A satisfying the matrix equation:

$$\begin{bmatrix} 2 & 1 \end{bmatrix}$$
  $\begin{bmatrix} -3 & 2 \end{bmatrix}$   $\begin{bmatrix} 1 & 0 \end{bmatrix}$ 

 $\begin{vmatrix} 2 & 1 \\ 3 & 2 \end{vmatrix} A \begin{vmatrix} -3 & 2 \\ 5 & -3 \end{vmatrix} = \begin{vmatrix} 1 & 0 \\ 0 & 1 \end{vmatrix}$ 

$$\begin{bmatrix} 3 & 2 \end{bmatrix} \quad \begin{bmatrix} 5 & -3 \end{bmatrix} \quad \begin{bmatrix} 0 & 1 \end{bmatrix}$$
$$\begin{bmatrix} 4 \\ 1 \end{bmatrix} \quad \begin{bmatrix} -4 & 8 & 4 \\ -1 & 2 & 1 \end{bmatrix}$$

13. Find A, if 
$$\begin{bmatrix} 4 \\ 1 \\ 3 \end{bmatrix}$$
 A =  $\begin{bmatrix} -4 & 8 & 4 \\ -1 & 2 & 1 \\ -3 & 6 & 3 \end{bmatrix}$ 

3. Find A, if 
$$\begin{bmatrix} 1 \\ 3 \end{bmatrix}$$
 A =  $\begin{bmatrix} -1 & 2 & 1 \\ -3 & 6 & 3 \end{bmatrix}$  
$$\begin{bmatrix} 3 & -4 \end{bmatrix}$$

14. If 
$$A = \begin{bmatrix} 3 & -4 \\ 1 & 1 \\ 2 & 0 \end{bmatrix}$$
 and  $B = \begin{bmatrix} 2 & 1 & 2 \\ 1 & 2 & 4 \end{bmatrix}$ , then verify  $(BA)^2 \neq B^2A^2$ 

If possible, find BA and AB, where

$$A = \begin{bmatrix} 2 & 1 & 2 \\ 1 & 2 & 4 \end{bmatrix}, B = \begin{bmatrix} 4 & 1 \\ 2 & 3 \\ 1 & 2 \end{bmatrix}.$$

Show by an example that for  $A \neq O$ ,  $B \neq O$ , AB = O.

17. Given 
$$A = \begin{bmatrix} 2 & 4 & 0 \\ 3 & 9 & 6 \end{bmatrix}$$
 and  $B = \begin{bmatrix} 1 & 4 \\ 2 & 8 \\ 1 & 3 \end{bmatrix}$ . Is  $(AB)' = B'A'$ ?