## Step-1

Consider the following matrices equation:

$$M = I - UV$$
$$M^{-1} = I_n + U(I_m - VU)^{-1}V$$

Multiply $M$ and $M^{-1}$ to get $I$ $(MM^{-1} = I)$. This $M^{-1}$ shows the change in $A^{-1}$ when a matrix is subtracted from $A$.

## Step-2

Do the following calculations:

$$\begin{aligned}
MM^{-1} &= (I_n - UV)\left(I_n + U(I_m - VU)^{-1}V\right) \\
&= I_n - UV + U(I_m - VU)^{-1}V - UVU(I_m - VU)^{-1}V \\
&= I_n - UV + U(I_m - VU)^{-1}V(I_m - VU) \\
&= I_n - UV + U(I_m - VU)^{-1}(I_m - VU)V \\
&= I_n - UV + UV
\end{aligned}$$
$$MM^{-1} = I_n$$

## Step-3

Therefore, $\boxed{MM^{-1} = I_n}$.