Step-1

We have to prove that the inverse of a Hermitian matrix is also Hermitian.

Step-2

Let A be a Hermitian matrix.

Then $A^H = A$

Let A^{-1} be the inverse of A.

Then $AA^{-1} = I$

Now

$$\left(AA^{-1}\right)^H = (I)^H$$
$$\Rightarrow \left(A^{-1}\right)^H A^H = I \quad \left(\text{since } I^H = I\right)$$
$$\Rightarrow \left(A^{-1}\right)^H A = I \quad \left(\text{since } A^H = A\right)$$

Therefore $\left(A^{-1}\right)^H$ is the inverse of A.

Hence A^{-1} is also Hermitian matrix.

Hence the inverse of a Hermitian matrix is again a Hermitian matrix.