Step-1

Suppose that A^2 is the inverse of the matrix B.

The objective is to show that the inverse of A is AB.

Step-2

Use the result that if M is the inverse of N then $NM^{-1} = M^{-1}N = I.$ ..... (1)

Since A^2 is the inverse of the matrix B, so

$A^2B = BA^2 = I.$

Use the equation $A^2B = I$ to get the result.

$$
\begin{aligned}
&A^2B = I \\
&(AA)B = I && \text{Use } A^2 = AA \\
&A(AB) = I && \text{Associative law holds for matrix multiplication.}
\end{aligned}
$$

By the result in (1), the product AB is the inverse of the matrix A.