Solution (#614) Let A and B be $n \times n$ invertible matrices. As matrix multiplication is associative, then

$$(AB)(B^{-1}A^{-1}) = A(BB^{-1})A^{-1} = AA^{-1} = I$$

and

$$(B^{-1}A^{-1})(AB) = B^{-1}(A^{-1}A)B = B^{-1}B = I.$$

Hence AB is invertible and $(AB)^{-1} = B^{-1}A^{-1}$.