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## Let A and B be nxn matrices. Prove that AB is invertible and (AB)^-1=B^-1A^-1.?

Let A and B be nxn matrices. Prove that AB is invertible and (AB)^-1=B^-1A^-1.
Thank you in advance.

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### Answers

🏆 **Best Answer:**  We cannot prove that AB is invertible unless we know that 🚩
and B are both invertible.

So assuming that A and B are both invertible, then there exist $A^{-1}$ and $B^{-1}$ such
that:
$A A^{-1} = A^{-1} A = I$
$B B^{-1} = B^{-1} B = I$

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

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

Since $(AB)(B^{-1}A^{-1}) = (B^{-1}A^{-1})(AB) = I$, then $(B^{-1}A^{-1}) = (AB)^{-1}$

**Mathmom** · 7 years ago

👍 2      👎 0                                                      Comment

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(AB)^-1=B^-1A^-1.?

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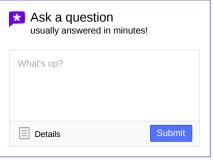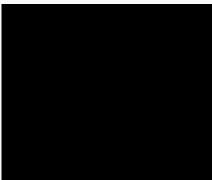
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