RH 1.9

MATH 5, Jones

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Refrigerator Homework

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$AD = I$
$A^{-1}(AD) = A^{-1}I$
$(A^{-1}A)D = A^{-1}I$
$ID = A^{-1}$
$D = A^{-1}$

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$(B - C)D = 0$
$(B - C)DD^{-1} = 0D^{-1}$
$(B - C)I = 0$
$B - C = 0$
$B = C$

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$C^{-1}(A + X)B^{-1} = I_n$
$(A + X)B^{-1} = CI_n = C$
$A + X = CB$
$X = CB - A$

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a: B is invertible because it appears in an equation where both sides represent the inverse of an invertible matrix. If B were not invertible, the equation would not properly define an inverse on the left-hand side. b: $(A-AX)^{-1} = X^{-1}B$.
$A - AX = B^{-1}X$.
$A = AX + B^{-1}X$.
$A = (A + B^{-1})X$.
$X = (A + B^{-1})^{-1}A$

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Because if its invertible its linearly independent, meaning it spans $\mathbb{R}^n$. Simple stuff really

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