10. Let A have an inverse and let $\beta \neq 0$. Prove that $(\beta A)^{-1} = \frac{1}{\beta} A^{-1}$.

Show ① $(\beta A)(\frac{1}{\beta} A^{-1}) = I$

② $\frac{1}{\beta} A^{-1} (\beta A) = I$

① $(\beta A)(\frac{1}{\beta} A^{-1})$

$= \beta (A \cdot \frac{1}{\beta}) A^{-1}$

$= \beta (\frac{1}{\beta} A) A^{-1}$

$= (\beta \cdot \frac{1}{\beta}) \cdot (A \cdot A^{-1})$

$= 1 I = I$

② $(\frac{1}{\beta} A^{-1})(\beta A)$

$\frac{1}{\beta} (A^{-1} \beta) A$

$\frac{1}{\beta} (\beta A^{-1}) A$

$(\frac{1}{\beta} \beta)(A^{-1} A)$

$1 I = I$

So $(\beta A)^{-1} = \frac{1}{\beta} A^{-1}$