SOLUTION SET 6B

ALEX LEVIN
MATH 23B
PROF. BOLLER

(5) **Suppose $f : \mathbb{R}^n \longrightarrow \mathbb{R}^n$ is differentiable and has an inverse function $f^{-1} : \mathbb{R}^n \longrightarrow \mathbb{R}^n$ which is also differentiable. Show that:**

$$[J(f^{-1})](a) = [(Jf)(f^{-1}(a))]^{-1}$$

We have that $ff^{-1} = I$ where I is the identity map. Now, clearly $JI(a) = I$ for all a, and applying the chain rule to the left hand side gives us $[Jf(f^{-1}(a))][J(f^{-1}(a)] = I$, and so, $[J(f^{-1})](a) = [(Jf)(f^{-1}(a))]^{-1}$ as desired.

All of you got this problem right.