Problem 1.3.10.5

Prove that $|a \cdot b| = |a||b|$.

Proof. If $a$ and $b$ are positive, $a \cdot b$ is positive. By definition of absolute value, $|a \cdot b| = a \cdot b$, $|a| = a$ and $|b| = b$. Therefore, $|a \cdot b| = |a||b|$. Now, if either $a$ or $b$ are negative, their additive inverse will be positive (if $a$ is negative, $-a$ is positive). Now, $-a = (-1)a$. So, if multiplying the inside of an absolute value by $-1$ doesn’t change the result, our proof is complete. This result, though, was proven in step 4. Thus, $|a \cdot b| = |a||b|$. 

\end{proof}