Let $z$ and $w$ be two complex numbers such that $\overline{z}w \neq 1$, where $\overline{z}$ denotes the complex conjugate of $z$. Prove that if $|w| < 1$ and $|z| < 1$, then

$$\left| \frac{z - w}{1 - \overline{z}w} \right| < 1.$$

**Hint:** First show why you can assume $z$ is real.