Example 83 : As shown in Figure 3, construct the circumscribed quadrilateral $A_1B_1C_1D_1$ of the quadrilateral $ABCD$, if $A_1A=A_1D$, $B_1B=B_1A$, $C_1C=C_1B$, $D_1D=D_1C$, then the quadrilateral $ABCD$ is a circular inscribed quadrilateral.

$$\frac{\frac{A-B}{A_1-B_1}}{\frac{C_1-B_1}{B-A}}\frac{\frac{D_1-C_1}{C-B}}{\frac{B-C}{B_1-C_1}}\frac{\frac{C-D}{C_1-D_1}}{\frac{A_1-D_1}{D-C}}\frac{\frac{B_1-A_1}{A-D}}{\frac{D-A}{D_1-A_1}}=\left(\frac{D-C}{D-A}\frac{B-A}{B-C}\right)^2$$