Example 1 66 : As shown in Figure 1, in the parallelogram $ABCD$, M and N are the circumcentres of ABC and $\triangle ADC$ respectively . Prove: $\triangle CM \perp AN$, $\angle AMC = \angle ANC$.

$$\left(\frac{C-M}{A-N}\right)^2 = -\frac{\dfrac{C-M}{D-A}\dfrac{A-D}{A-N}}{\dfrac{A-C}{C-M}\dfrac{A-N}{A-C}}, \quad \left(\frac{\dfrac{N-C}{N-A}}{\dfrac{M-A}{M-C}}\right)^2 = \frac{\dfrac{A-C}{A-M}\dfrac{C-M}{D-A}\dfrac{A-D}{A-N}\dfrac{C-N}{A-C}}{\dfrac{A-M}{A-B}\dfrac{A-C}{C-M}\dfrac{A-N}{A-C}\dfrac{B-A}{C-N}}.$$