Example 2 22 : As shown in the figure, in $\triangle ABC$, D and E are on AB and AC, DE ∥ BC, five points A, D, M, Q and E share a circle, and four points A, B, N and Q share a circle. B, C, P, N four points share a circle, A, M, P, C four points share a circle, prove: M, N, P, Q four points share a circle.

$$\frac{\dfrac{M-Q}{M-P}}{\dfrac{N-Q}{N-P}} = \frac{M-A}{M-P}\frac{M-A}{C-A}\frac{D-A}{D-Q}\frac{N-P}{N-B}\frac{N-B}{N-Q}\frac{Q-D}{Q-A}\frac{A-B}{A-D}\frac{A-C}{A-E}\frac{D-E}{B-C},$$