Brianchon's Theorem

The diagonals of a hexagon (6 points) thats inscribes a circle concur.

proof

(WLOG, $GR = LM$

$AL = AG$
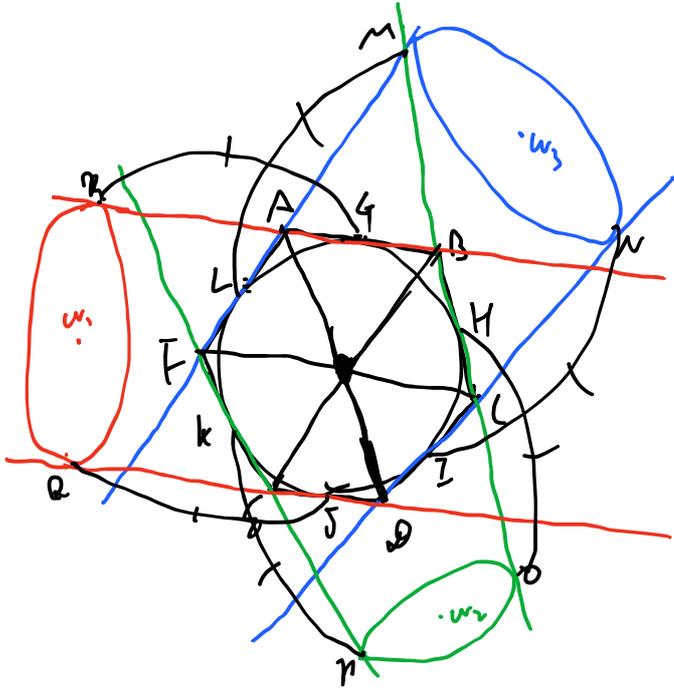
$\therefore RA = RM \iff A \in rad(w_1, w_3)$

$JD = DI$

$\therefore QD = DW \iff D \in rad(w_1, w_3)$

$\therefore AD = rad(w_1, w_3)$

$rad(w_1, w_2) = EB$
$rad(w_2, w_3) = FL$
$rad(w_3, w_1) = AD$

By Monge's Theorem,

$EB, FL,$ and AD concurs.