Discussion of HW2

The dual of the theorem given may be stated as follows: Let $U VW$ be a triangle inscribed in a circle $\gamma$, and let $u, v, w$ be the tangents to $\gamma$ at $U$, $V$ and $W$ respectively. Then the three points

$$UV \cap w, \quad VW \cap u \quad \text{and} \quad WU \cap v$$

are collinear. (The names $U, V, W$ did not appear in the original question; but the meaning of the theorem is not changed by the choice of names.)

Note that when intersecting the three secants (sides of the triangle) with the three tangents, it is best to be precise about which intersections are required. I have done this using explicit names for the secants and tangents; one might instead use fewer symbols and more words, as in the following: Consider a triangle inscribed in a circle $\gamma$. Intersect each side of the with the tangent to $\gamma$ at the opposite vertex. Then the resulting three points of intersection are collinear. (Which version sounds more natural to you, this version or the previous one with symbols?)
Note that strictly speaking, this statement may fail in the Euclidean plane due to the existence of parallel lines. Here, for example, we see that $UV \parallel w$ and so the correct conclusion would instead be that the points $VW \cap u$ and $WU \cap v$ form a line parallel to $UV$ and $w$:

And once again, $\gamma$ can instead be an arbitrary nondegenerate conic (i.e. an ellipse, hyperbola or parabola).