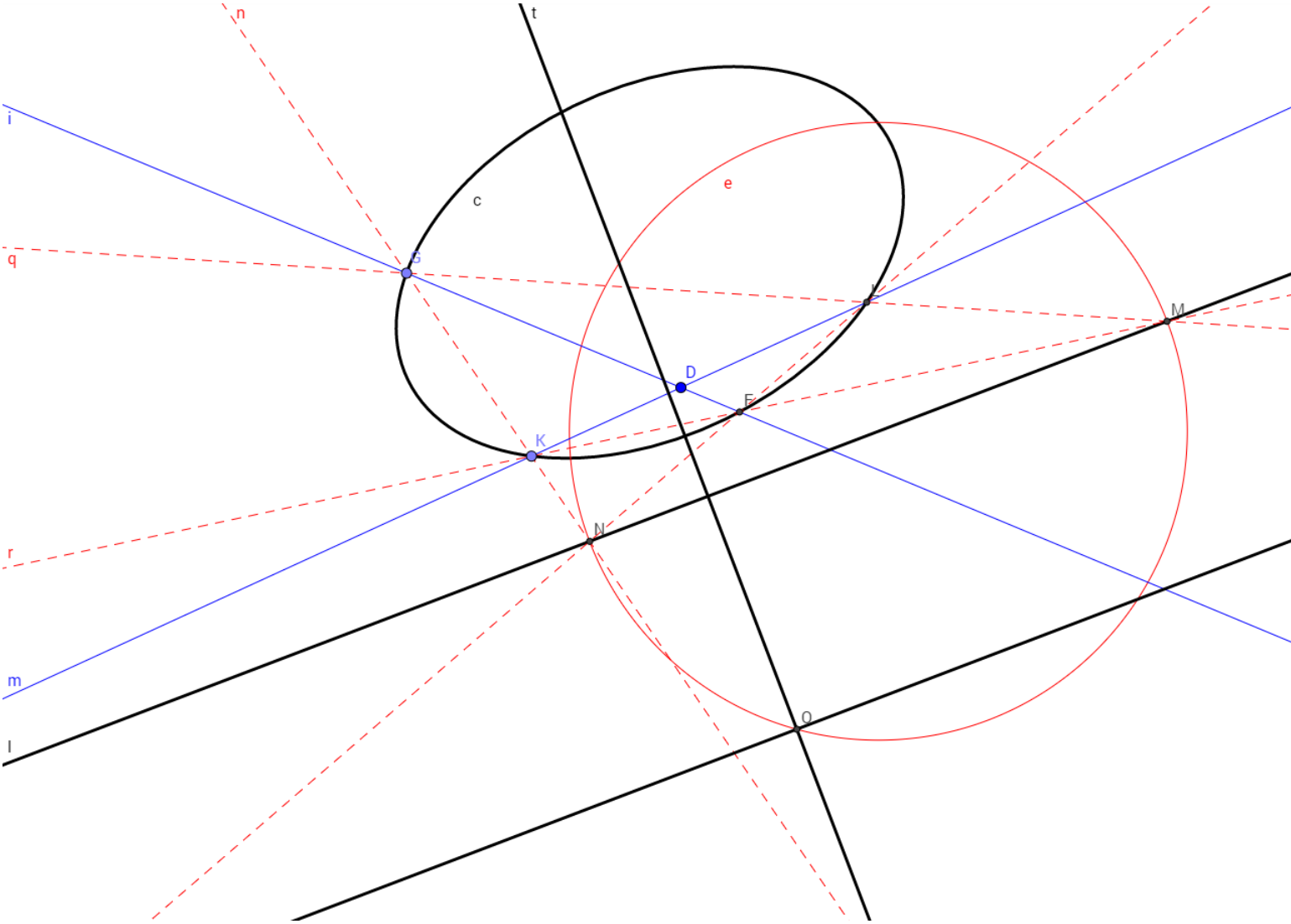
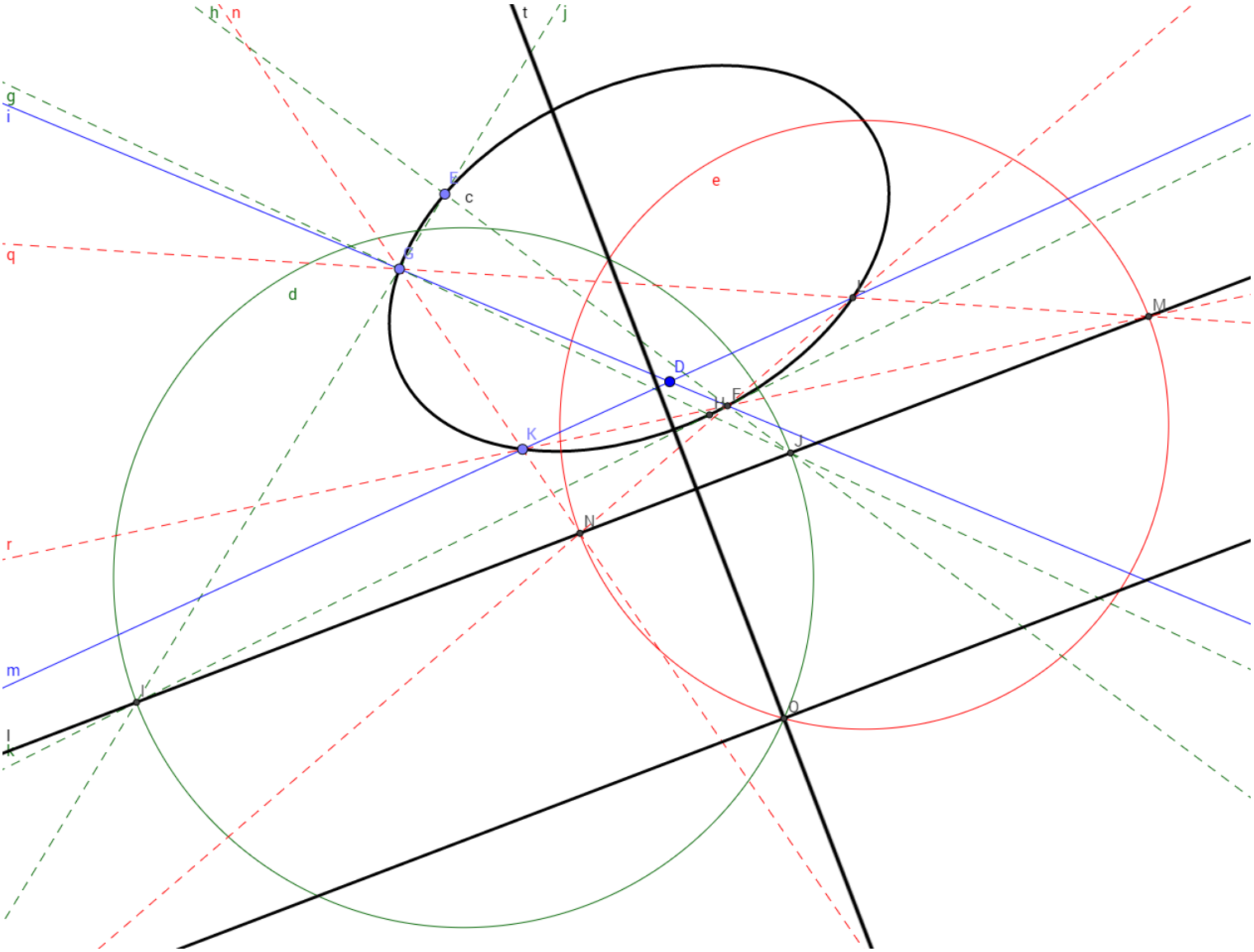
Lines i (intersects the ellipse at G and F) and m (intersects the ellipse at K and L) are arbitrarily chosen lines that pass through the image of the center of the circle. Before refracting, these lines also pass through the center of the circle and create a rectangle. This means that the quadrilateral $KFGL$ is the image of a rectangle. Let SK and FL intersect at N, KF and SL intersect at M. N and M lie on the focal plane because parallel lines intersect at the focal plane. Thus, we can reconstruct the focal plane of the lens. Furthermore, the center of the lens O must lie on the circle with diameter NM (since NO and OM are perpendicular to each other).



This means that if we construct an additional quadrilateral lying on the ellipse, we can determine another circle on which O must lie. The intersection point of the two circles gives the position of O. The lens passes through O and is parallel to the focal plane. The main optical axis also passes through O and is perpendicular to the lens.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