

1. Given the circle $\mathcal{C}(O, r)$ and two points P, Q in the plane, denote by P', Q' the inverses of P, Q , respectively with respect to the circle $\mathcal{C}(O, r)$.

$$\text{Show that } |P'Q'| = r^2 \frac{|PO|}{|OP| \cdot |OQ|} .$$

Note: Consider the cases when O, P, Q are collinear and when O, P, Q are not collinear.