Problem: Eccentricity Equals One

Let $F$ be a fixed point in the plane and let $l$ be a fixed line in the plane with $\text{dist}(F, l) = k$. We have shown that if $0 < e < 1$, then the set of points $P$ in the plane with the property

$$\frac{PF}{\text{dist}(P, l)} = e$$

is an ellipse. Describe the set of points $Q$ in the plane with the property

$$\frac{QF}{\text{dist}(Q, l)} = 1.$$