PROJECTIVE GEOMETRY

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CHAPTER 1
Conics

1.1 Group Laws on Conics

Consider a conic section C and a point $O \in C$. For any points $P, Q \in C$, let ℓ' be the line passing through O such that $\ell' \| \ell$ where ℓ is the line joining P and Q. If ℓ' intersects C at a point other than O, call that point R. Otherwise, take $R = O$. Define a binary operation $\oplus : C \times C \to C$ as $P \oplus Q := R$.

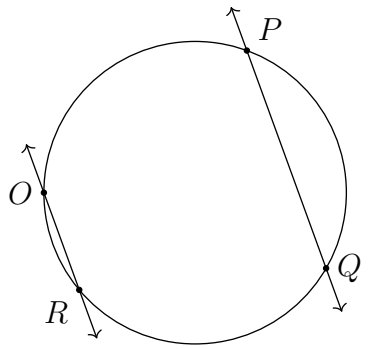

Figure 1.1 : $P \oplus Q$ when C is a circle.

Show that C forms a group under $\oplus$ and find formulae to calculate $P \oplus Q$.