

# Intersection of lines

October 19, 2018

## Abstract

This document outlines a method for determining whether the intersection of two lines falls within a circle.

## 1 Setup

Consider two lines each defined by two points on a circle,  $P_1$  and  $P_2$  and  $Q_1$  and  $Q_2$ .

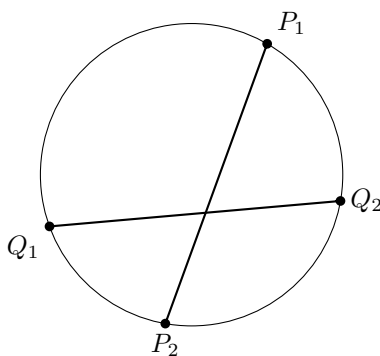


Figure 1: Two lines

These lines can obviously intersect or not. This intersection can be checked without reference to the lines, but by simply looking at the angles of the points.

If  $P_1$  and  $P_2$  are “next to” each other, that is, there is no point between them, then they do not intersect any point. On the other hand, if there is a point between them, but not that point’s counterpart, then that point’s line will intersect it.

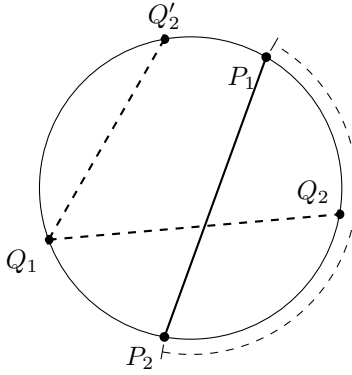


Figure 2: Intersecting vs. Non-intersecting lines

We can see that the line  $\overline{Q_1Q_2}$  intersects  $\overline{P_1P_2}$ , while  $\overline{Q_1Q'_2}$  does not. In fact, any placement of  $Q_2$  within the dashed interval will result in an intersection, while any outside will not. This, in order to check for intersection, it is sufficient to check the sequence of angles.

## 2 Method

TODO

**Theorem 1.** *ur mom gay lol*

*Proof.* 1. **FACTS**<sup>1</sup>

2. **LOGIC**

*libtards destroyed*

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<sup>1</sup>Shapiro, Benjamin, *SJWs DESTROYED compilation, part #23*, YouTube, 2013