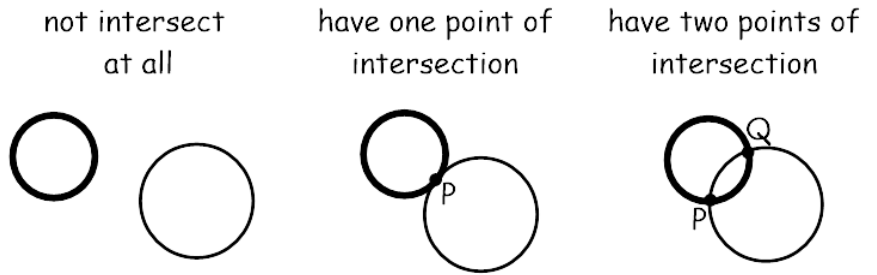


### Intersection of Two circles

Two circles can intersect in two points, one point or not at all as shown in the diagrams on the right.



It is also possible that one circle may be inside the other:

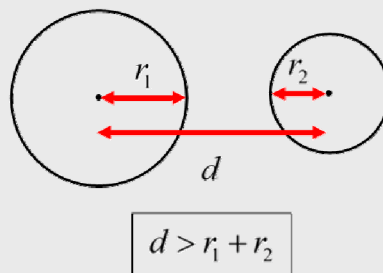
(the two circles have the same tangent at P)

It is not possible to find the points of intersection by substituting one equation into the other like we can for straight lines and circles. Instead we consider lengths to decide if the two circles touch or not.

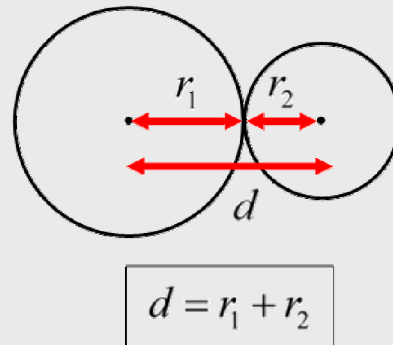
#### Facts:

If one circle has radius  $r_1$ , a second circle has  $r_2$  and the distance between their centres is  $d$ , then:

- If  $d > r_1 + r_2$  then the two circles **do not intersect**



- If  $d = r_1 + r_2$  then the two circles **intersect in one point**



- If  $d < r_1 + r_2$  then the two circles **have two points of intersection**

