Exercise sheet 3

Exercise 1. We start with a triangle ABC, for instance $A(2, 4)$, $B(0, 0)$ and $C(6, 0)$. Let PQR be the orthic triangle of the triangle ABC, with P on BC, Q on CA and R on AB. Let K be the intersection of BC with the line through A which is parallel to RP.
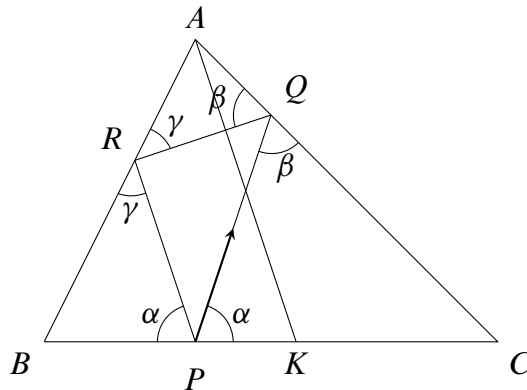
1°) Draw an exact picture of the triangles ABC and PQR.
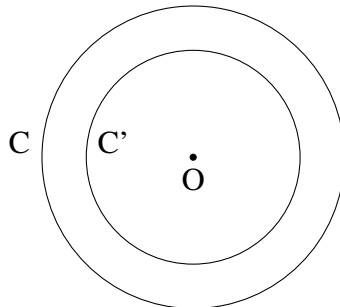
2°) What are the coordinates of the point K ?

3°) Draw a trajectory starting at some point M on the segment PK between P and K in a direction parallel to PQ.

4°) What happens if you start from K in the direction of PQ ?

5°) What happens if you start from $(\frac{7}{2}, 0)$ in the direction of PQ ?

Exercise 2. Let C be a circle withe center O and radius 5. Let C' be another circle with same center O but with a smaller radius $\frac{5\sqrt{2}}{2}$. We consider the billiard whose border is the circle C. Find a trajectory which is tangent to C'. Is this trajectory periodic ? what do you think would happen if we take C' to be the circle with radius 3,54 ?

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