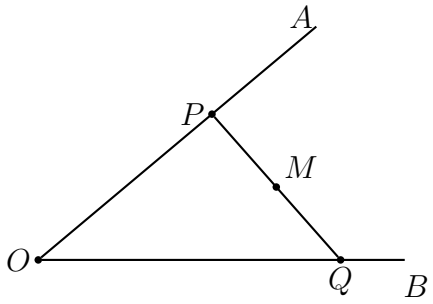
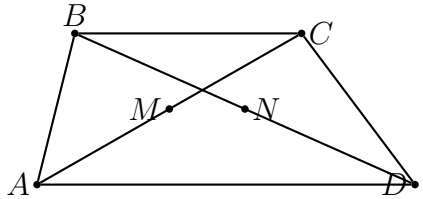
MAT 360: PRACTICE MIDTERM (CORRECTED)

Please remember that you are only allowed to use notions and results we had proved in class. "Construct" means "construct using a ruler and compasss".

1. Given an angle $\angle AOB$ and a point M inside it, construct a segment PQ such that
- M is the midpoint of PQ
- P is on side OA
- Q is on side OB



2. Given a trapezoid $ABCD$ with bases $AD = 5cm$, $BC = 3cm$, find the distance MN, where M is midpoint of AC, N is the midpoint of BD. (You must prove your result!)



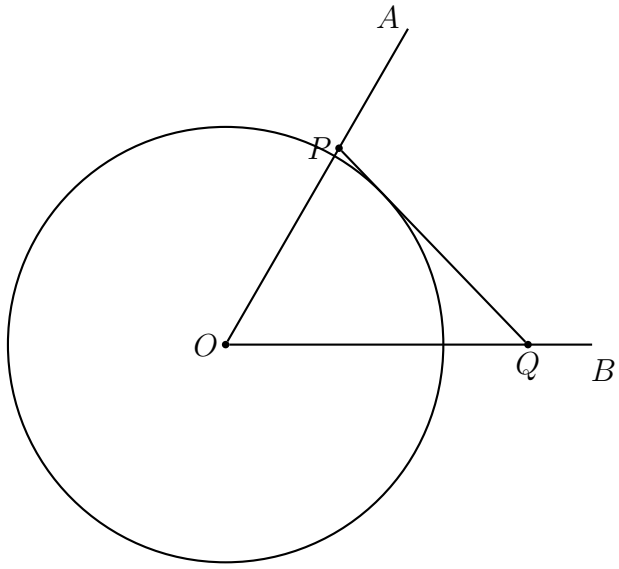
3. [This problem has been corrected; original version didn't contain enough data] Construct a triangle $\triangle ABC$, given $\angle A$, side AB, and the difference $AC - BC$.

4. In a triangle $\triangle ABC$, let AA', BB' be altitudes from vertices A, B respectively. Prove that if $AA' \simeq BB'$, then $\triangle ABC$ is isosceles.

5. Let C_1, C_2 be two circles which are tangent to each other; let P be the tangency point. Let l, m be two lines through P. Let A, B, C, D be the intersection points of lines l, m with the circles C_1, C_2. Prove that $ABCD$ is a trapezoid.

6. (a) Construct a triangle, given side BC, $\angle A$ and length of the altitude from vertex A.

(b) Given an angle $\angle AOB$ and a circle C with center at O, construct a segment PQ such that
- PQ is tangent to C
- P is on side OA
- Q is on side OB


A
P
O
Q
B