MAT 360: PRACTICE PROBLEMS FOR THE FINAL

The following are some practice problems for the final exam.

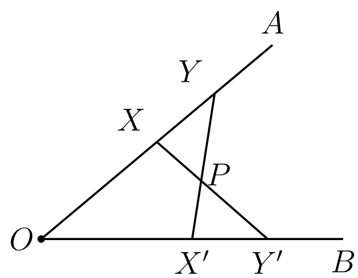
1. Textbook, Problem 77

2. Textbook, Problem 93

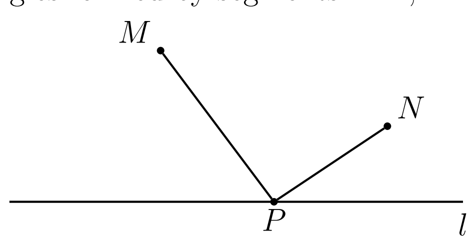
3. Textbook, Problem 139

4. Textbook, Problem 192

5. Let AOB be an angle, and let points X, Y on side AO and X', Y' on side OB be chosen so that $OX \simeq OX'$, $OY \simeq OY'$. Let P be the intersection of segments XY', $X'Y$. Prove that then OP is the bisector of angle AOB.



6. Let points M, N be on the same side of line l. Find a point P on l such that the angles formed by segments MP, NP with line l are congruent. [Hint: use reflection!]



7. Using straightedge and compass, construct a triangle, given two sides and the median to the third side. [Hint: this triangle is half of a parallelogram]

8. Using straightedge and compass, construct on the sides of given angle AOB points X, Y so that the segment XY is congruent to given segment PQ and angle OXY is congruent to given angle.

9. Textbook, Problem 242

10. Textbook, Problem 246

11. Textbook, Problem 266

12. Textbook, Problem 274

13. Textbook, Problem 372

14. Given segments of lenth a and b, construct (using straightedge and compass) segments of length $\sqrt{a(a+b)}$; $\frac{a^2}{b} + \frac{2}{3}b$

15. In a triangle ABC, mark points which divide each side into 3 equal parts. Connect each of these points with the opposite vertex. This gives 6 lines inside $\triangle ABC$. Consider the hexagon formed by these 6 lines. Prove that the three diagonals connecting opposite vertices of this hexagon intersect at a single point.