

HOMEWORK 1 - MATH 325

DUE DATE: When Chapter 2 has been covered!

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. A few randomly selected problems will be graded for a total of 10 points. It is necessary to show your work.

GOOD LUCK!!

1. Prove SSA for right triangles: If $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$ and if $\hat{B} = 90^\circ$ and $\hat{E} = 90^\circ$, then $\triangle ABC \cong \triangle DEF$.
2. Prove SAA: If $\hat{A} \cong \hat{D}$, $\hat{B} \cong \hat{E}$ and $\overline{BC} \cong \overline{EF}$, then $\triangle ABC \cong \triangle DEF$.
3. Let l be a line and P a point not on l . Construct a line that contains P and that is perpendicular to l .
4. Let l be a line and P a point not on l . Construct a line that contains P and that meets l at a 45° angle. Construct a line that contains P and that meets l at a 30° angle. (To do this exercise you need to use the fact that the sum of the angles in any triangle is 180° .)
5. Given triangles $\triangle ABC$ and $\triangle DEF$ such that $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$ and $\hat{A} > \hat{D}$, prove that $BC > EF$.
6. Given BC and A_1, \dots, A_n , prove that $BC < BA_1 + A_1A_2 + \dots + A_nC$.
7. Prove that the sum of the angles in a convex n -sided figure is $(n - 2)180^\circ$.
8. Prove that a parallelogram $ABCD$ is a rectangle if and only if the diagonals \overline{AC} and \overline{BD} are congruent.
9. Prove that a parallelogram $ABCD$ is a rhombus if and only if the diagonals \overline{AC} and \overline{BD} are perpendicular to each other.