Math 460: Homework # 1. Due Thursday August 22

Rules for writing up proofs on the homework:

- Any fact you use must be from the Course Notes or from previous homework (but not from the Geometer's Sketchpad problems).
- You must give a justification for every step in your proof (but there are three exceptions: when you draw in a line you don't have to mention BF 7, when you extend a line you don't have to mention BF 9, and when you know two lines are parallel you can assume that any segments on those lines are parallel.)
- If you are using a definition, say which one it is (that is, say "definition of parallelogram" or "definition of congruent triangles"). If you are using a Basic Fact or Theorem, refer to it by number. If you are using a fact from a previous homework problem, say which problem it was, and make it clear what fact you have in mind.
- When you use a definition, Basic Fact, or Theorem, say how it applies to your situation. For example, if you use BF 5 or Theorem 2, say what pair of parallel lines you are using; if you use BF 4, say what pair of similar triangles you are using; if you are using Theorem 14, say what triangle you are applying it to.
- For an if and only if ($\Longleftrightarrow$) proof you must say specifically what the given and to prove are for both directions.
- You must sum up at the end of the proof to show that you proved what was required.
- If your proof is too complicated for the grader to follow, you may lose points.

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1. Let A and B be two points on a circle with center O. Prove that O lies on the perpendicular bisector of AB.

2. (See Figure 1) Given: UV is parallel to AB, UW is parallel to BC, and VW is parallel to AC. To prove: $\triangle AWU \cong \triangle WBV$.

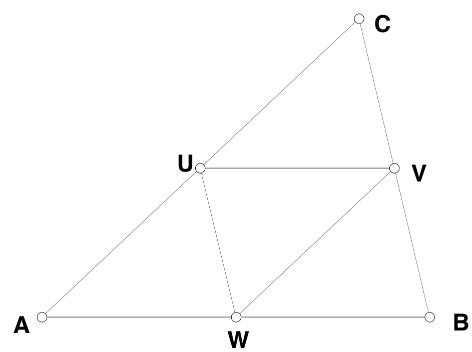

Figure 1

3. (See Figure 2) Given $AB = AC = BC$ (that is, $\triangle ABC$ is an *equilateral* triangle). Let P be a point inside the triangle. Let a, b, and c be the distances from P to $\overleftrightarrow{AB}$, $\overleftrightarrow{AC}$ and $\overleftrightarrow{BC}$ respectively. Let h be the distance from A to $\overleftrightarrow{BC}$. To prove: $a + b + c = h$. (Hint: think about areas.)

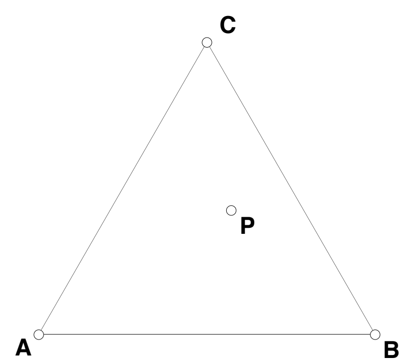

Figure 2