MA 341 – College Geometry

Homework Assignment and Proofs **Due Tuesday, June 8**

Homework:

1. **Section 3.3:** 4, 7, 10, 18

   4. The small triangles are all congruent by SSS, so all of the vertex angles are congruent. Since there are 5 of them, and their sum is 180, the angle must be $180/5 = 36$.
   7. See back of book.
   10. (a) This follows from Ssa (or HL).
       (b) $\triangle ABD \cong \triangle DCA$ by SSS, so $\angle A \cong \angle D$ by CPCF.
   18. $\triangle RWU$ is isosceles, so $\angle R \cong \angle U$. Therefore, $\triangle WRS \cong \triangle WUT$. Thus $\angle RWS \cong \angle UWT$ by CPCF. I'm not sure why they gave all the extra information.

2. **Section 3.4:** 1, 2, 3, 6, 12

   1. See back of book.
   2. Only (3) cannot exist.
   3. See back of book.
   6. We must have $30 < x$ immediately. Note that $\text{m}\angle QPR \leq 70$, so $\text{m}\angle QPS < 70$. Thus, in fact, $x > 70$. Also, $x < 100$.
   12. Since $\triangle NMT$ is isosceles, $\text{m}\angle MTN = 30$. Thus, by the exterior angle inequality, $\text{m}\angle K < 30$.

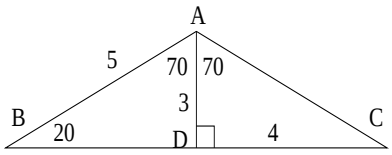
3. **Section 3.5:** 1, 6, 7, 10

   1. See back of book.
   6. All of the angles in $\triangle UVW$ are congruent. In $\triangle VTW, \angle WVT$ has the smallest measure. Also, by the SAS inequality, $\text{m}\angle WVT <\text{m}\angle UVW$. Thus, $\angle WVT$ is the smallest.
   7. See back of book.
   10. Since $\text{m}\angle S \leq 5$, $\angle S$ is the smallest angle in the triangle. Therefore, $\overline{RT}$ is the shortest side.

4. **Section 3.6:** 2, 3

   2. $\triangle ABC \cong \triangle DEF$ by HL (or SsA).
   3. See back of book.

5. Find the missing angle measures and distances in the figure below. Explain your solution.



Solution: The angle bisector at A is perpendicular to $\overline{BC}$, so we get $\triangle ABD \cong \triangle ACD$ by ASA. Therefore, $AC = 5, BD = 4$, and $m\angle C = 20$.