Math 133
Fall 2013

UPDATED GENERAL INFORMATION — NOVEMBER 20, 2013

Here is the seventh homework assignment, which should be completed by on **Wednesday, December 4, 2013.** Some questions in the second midterm examination are very likely to be along the lines of items in this and the previous assignments.

The following references are to the file `math133exercises05.f13.pdf` in the course directory.

- **Section V.3:** 2–4, 8
- **Section V.4:** 3–6

Study hints for the second examination

The new material covered on the examination will come from Sections II.3 – III.4 of the course notes, with the same limits on coverage from Sections II.4 and II.5 that were described in `aabUpdate09f13.pdf`; namely, everything up to the subheading *Classical superposition* in Section II.4 (but nothing further) and everything up to the subheading *Parallelism and affine transformations* in Section II.5 (but nothing further). About 20 to 25 per cent will deal with statements of definitions, assumptions or results (propositions, theorems *etc.*) and the rest will involve various sorts of proofs and derivations. In some cases the latter may involve simply giving reasons, and in other cases this may involve proving statements at the level of fairly short proofs in the notes or relatively uncomplicated homework exercises (or the problems in the second quiz, but without the steps outlined explicitly).

Here are more specific suggestions, including some problems which were considered but either not included or may appear in a simplified form.

(1) If a parallelogram's sides all have equal length, it it a square? Prove this or give a counterexample.

(2) Prove that a parallelogram is a rectangle if and only if the lengths of its diagonals are equal.

(3) Given an isosceles ΔABC with $d(A,B) = d(A,C)$ and $\angle BAC$ obtuse, determine whether $d(B,C)$ is longer or shorter than the other two sides and give a proof for your assertion.

(4) Suppose that we are given $A * B * C$ and $D * E * F$. Prove that if $d(A,C) = d(D,F)$ and $d(A,B) = d(D,E)$, then $d(B,C) = d(E,F)$.

(5) Suppose we are given ΔABC and $D \in (BC)$ is such that $[AD$ bisects $\angle BAC$. If $|\angle ABC| = x$ and $|\angle ACB| = y$, find $|\angle ADC|$.

(6) Given two lines that are cut by a transversal, give the criteria defining concepts like alternate interior angles, alternate exterior angles and corresponding angles (an exam problem probably will require some understanding beyond simply repeating the definition).

(7) Know the definitions of various polygons, including convex quadrilaterals, parallelograms and trapezoids.

(8) Know the results involving inequalities for the measurements of sides and angles in triangles.

(9) Know the statements of the four concurrence theorems for triangles and the names for the points of concurrency in each one.

(10) Finally, a review of the following exercises is recommended: II.3.3–6, II.4.1–5, D4 (in the `exercises2a` file), III.2.1–10 and D4 (in the `exercises3a` file).