Math 304 - Dr. Miller - Exam #2, Spring 2018 - Thursday, May 3, 2018

This exam is worth 100 points, which will be scaled to the agreed-on 150 points after grading.

1. Perform each task below on a fresh piece of paper. Make sure all construction marks are clearly visible.
   (a) Draw a reasonably-sized triangle $\triangle ABC$ and construct a congruent copy $\triangle A'B'C'$ using SAS.
   (b) Draw a reasonably-sized triangle $\triangle XYZ$ and construct its circumcircle.
   (c) Construct a perfect square.
   (d) Draw 3 different-sized line segments, labeling them 1, a, and b. Construct a segment of length ab.

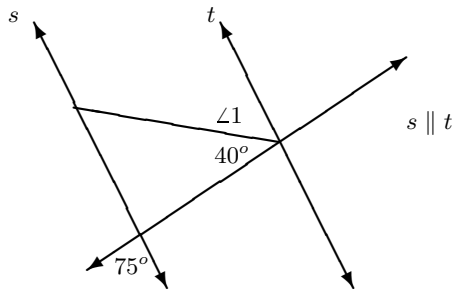
2. Choose THREE out of four: Name and state a theorem that's crucial to prove that the method produces the object we claim. (I'll give you the name for a deduction. All four are different.)
   (a) Constructing a perpendicular
   (b) Copying an angle
   (c) Constructing a parallel
   (d) Dividing line segments

3. Prove this subcase of the Angle Bisector Theorem: If D is equidistant from the sides of $\angle ABC$ and D is in the interior of the angle, then D lies on the bisector of the angle.

4. (a) Prove that the opposite sides of a parallelogram are congruent.
   (b) As corollaries to the above, which other types of quadrilaterals must also have congruent sides?

5. Craft meaningful formal definitions of these familiar (but unrehearsed) concepts, following the Vankirk-McClure guidelines. (If you don't remember a concept, ask and I'll draw a picture.)
   (a) radius
   (b) hypotenuse
   (c) equiangular triangle
   (d) tangent line to a circle

6. Give 2-column-style proofs/solutions below; you may use complete sentences as reasons if you like.
   (a) Find the measurement of $\angle 1$. (You may include additional labels as needed.)



   (b) Assume *nothing* except that $\overline{AB} \cong \overline{AF}$ and $\overline{BF}$ and $\overline{AE}$ bisect each other. Find and prove a pair of congruent triangles.