MATH 402 Midterm 1 Practice

Wednesday 26 September, 2018

Prove or find a counterexample for each of the following statements. (On the true/false portion of the exam you will not be asked for proofs, but this is much better practice, for all parts of the exam.)

		True	False
(a)	SSA congruence is a theorem in Hilbert's axiomatic system.		
(b)	Let c be a Euclidean circle. Suppose that P and Q are two points such that the power of each with respect to c is equal to $\frac{1}{2}$. Then the segment from P to Q does not intersect the boundary of the circle.		
(c)	In neutral geometry, the angles of an equilateral triangle are always $60°$.		
(d)	Euclid's favourite thing about his axiomatic system was that he could prove that all of the axioms were mutually independent.		
(e)	In Euclidean geometry, if ℓ_1 and ℓ_2 are two unequal parallel lines, and m is another line which intersects ℓ_1 (but is not equal to ℓ_1), then m must intersect ℓ_2.		
(f)	Let A and B be two distinct points. A third point C is of equal distance from both A and B if and only if C lies on the perpendicular bisector of the segment $\overline{AB}$.		
(g)	We need to use the Parallel Postulate (or Playfair's Postulate) to make sense of the notion of two points being on the same side or on opposite sides of a line. If we don't have the Parallel Postulate, this notion doesn't make sense.		
(h)	An inscribed angle $\angle ABC$ is one where the vertex B lies on the minor arc determined by the points A and C.		
(i)	In neutral geometry, a line which is perpendicular to one of two parallel lines is also perpendicular to the other.		
(j)	Let c and c' be two circles with centres O and O' respectively. Assume that they intersect at a point T and that there is a line through T which is tangent to both c and c'. Then the point T lies on the line $\overleftrightarrow{OO'}$.		
(k)	Let c be a (Euclidean) circle, and assume that P and Q are two distinct points of c. Then the inverse of P with respect to c can never be equal to the inverse of Q with respect to c.		
(l)	$x^2 + 2y^2 = 4$ is the equation of a (Euclidean) circle.		
(m)	Given a triangle ΔABC, let D be the midpoint of $\overline{AB}$ and let E be the midpoint of $\overline{AC}$. Then $DE = \frac{1}{2}BC$.		