

MATH 226 – Homework #1
due September 12, 2006

For this problem set, do not consult Euclid's Elements for the answers.

- (1) Complete the proof of Proposition I.5 showing that the base angles in an isosceles triangle are equal.
- (2) Prove the ASA congruence theorem.
- (3) Prove the converse to the Pythagorean Theorem: if a triangle has sides of length a , b , and c such that $a^2 + b^2 = c^2$, then the angle opposite the side of length c is a right angle.
- (4) Prove Proposition III.22 showing that a central angle has twice the measure of an interior angle that subtends the same arc.
- (5) Conjecture and prove a statement concerning the interior angle of a triangle inscribed in a circle with base along the diameter.
- (6) Give an example of why AAA is not a congruence theorem for triangles. What about SSA?
- (7) Prove that our construction of an equilateral triangle is correct.
- (8) Prove that our construction of an angle bisector is correct.
- (9) Prove that our construction of the midpoint of a line segment is correct.