

MATH 6: HANDOUT 24
RULER AND COMPASS CONTINUED

CONSTRUCTIONS WITH RULER AND COMPASS CONTINUED

Remember from last class that geometric construction problems can be done using only a compass and a ruler. The ruler can only be used for drawing straight lines through two points, not for measuring distances!

When doing these problems, we need:

- Give a recipe for constructing the required figure using only ruler and compass
- **Explain why your solution does give the correct answer**

For the second part, we will frequently use the congruence tests for triangles.

CONGRUENCE TESTS FOR TRIANGLES

Recall that by definition, to check that two triangles are congruent, we need to check that corresponding angles are equal and corresponding sides are equal; thus, we need to check 6 equalities. However, it turns out that in fact, we can do with fewer checks.

Axiom 1 (SSS Rule). *If $AB = A'B'$, $BC = B'C'$ and $AC = A'C'$ then $\triangle ABC \cong \triangle A'B'C'$.*

Axiom 2 (ASA Rule). *If $\angle A = \angle A'$, $\angle B = \angle B'$ and $AB = A'B'$, then $\triangle ABC \cong \triangle A'B'C'$.*

Axiom 3 (SAS Rule). *If $AB = A'B'$, $AC = A'C'$ and $\angle A = \angle A'$, then $\triangle ABC \cong \triangle A'B'C'$.*

HOMEWORK

1. Given length a , construct a square with side a
2. Given length a , construct a regular hexagon with side a
3. Given three lengths a, b, c , construct a triangle with sides a, b, c
4. Construct an isosceles triangle, given a base b and altitude h .
5. Construct a right triangle, given a hypotenuse h and one of the legs a .
6. Given a circle, find its center.
7. Given a circle and a point P outside this circle, construct the line through P which would be tangent to this circle (i.e., would touch it at exactly one point).
8. A hen and a half lays an egg and a half in a day and a half. How many eggs do 6 hens lay in 6 days?