Math 5e, Homework 22
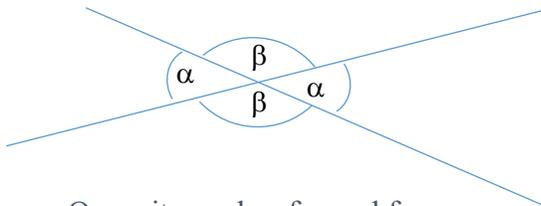
Instructions: Some of the problems we solved in class, and some are new. Please try to solve all problems, do your best, and show your work. Write on separate sheets of paper, not between the lines of this handout!
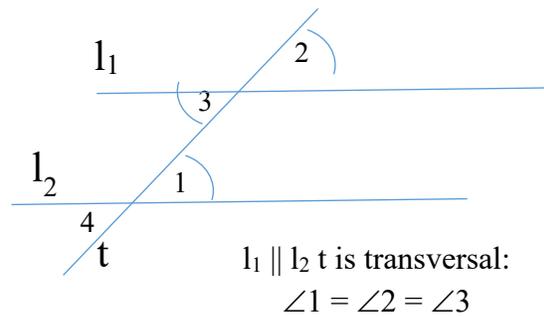
Geometry: Angles , Parallel lines

Opposite angles, formed from crossing straight lines, are equal.

$l_1 \parallel l_2$ t is transversal:

$$\angle 1 = \angle 2 = \angle 3$$

$\angle \alpha = \angle \alpha$ – opposite

$\angle 1 = \angle 3$ = alternate internal angles

$\angle \alpha + \angle \beta = 180^0$ – on a straight line,

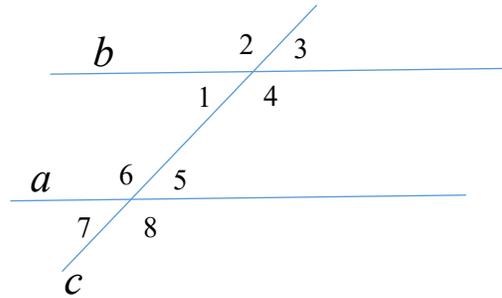$\angle 1 = \angle 2$ = corresponding angles

Or complementary angles

$\angle 4 = \angle 2$ = alternate exterior angles

From both these pieces of information, we can show that the sum of angles in a triangle is always 180º.
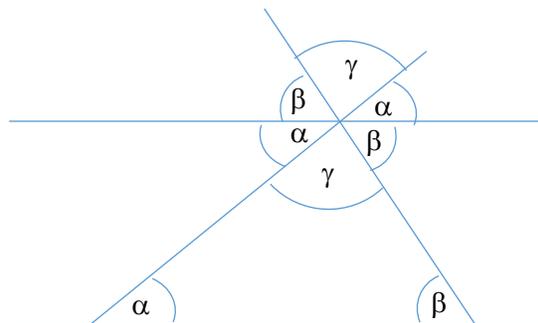
Homework

1. On the picture, *a* and *b*, which are parallel to each other, are intersected by line *c*. What are the relationships (name the type of angles):
   (a) $\angle 3$ and $\angle 5$
   (b) $\angle 2$ and $\angle 8$
   (c) Prove (explain) that $\angle 4 + \angle 5 = 180°$.

2. In the same picture,
   (a) if $\angle 7 = 65°$, find: $\angle 1$, $\angle 3$, $\angle 1 + \angle 6$
   (b) If you know that $\angle 7 = \angle 1$, prove that*: $\angle 1 = \angle 3$ and $\angle 5 = \angle 1$

   (* *or say why the angles will be equal*)

3. Intersecting at point B on triangle ABC is drawn line DS, such that DS is parallel to AC. Prove that (or say why the angles will be equal):
   (a) $\angle ACB = \angle SBC$
   (b) $\angle CAB = \angle DBA$
   (c) $\angle CAB = \angle SBK$
   (d) If $\angle CAB = 40°$ and $\angle BCA = 60°$, find angles $\angle ABD$ and $\angle SBC$
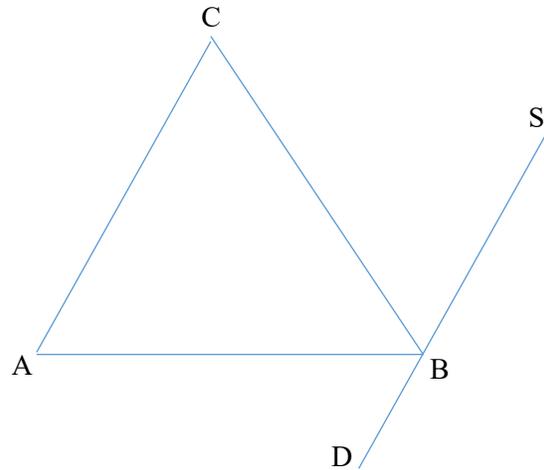
4. In triangle ABC, $\angle A = 35°$, $\angle B = 55°$, prove (explain) that this triangle is right-angled.

5. What type of triangle has one angle equal to the sum of the other two?

6. Find each of the outside angles of a right-triangle, if one of its angles is $58°$.