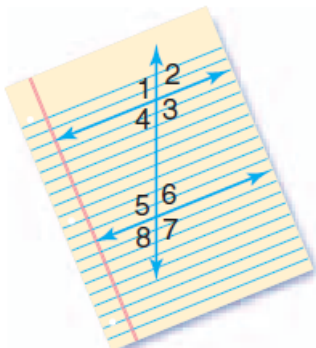# Angles formed by Parallel Lines and Transversal
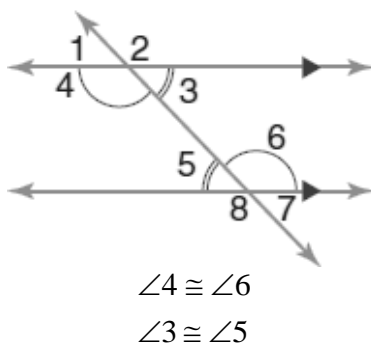
Step 1: Use a straightedge to darken any two horizontal lines on a piece of lined paper.

Step 2: Draw a transversal for the lines and label the angles 1 through 8. Use a protractor to find the measure of each angle.
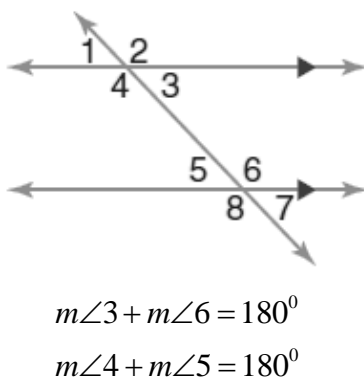
Theorem 1: Alternate Interior angles
If two lines are cut by a transversal, then each pair of alternate angles is congruent

$$\angle 4 \cong \angle 6$$
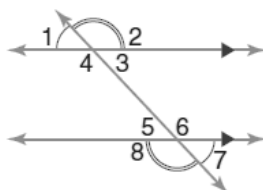$$\angle 3 \cong \angle 5$$

Theorem 2: Consecutive Interior angles
If two lines are cut by a transversal, then each pair of consecutive interior angles is supplementary

$$m\angle 3 + m\angle 6 = 180^0$$
$$m\angle 4 + m\angle 5 = 180^0$$

Theorem 3: Alternate Exterior angles

If two lines are cut by a transversal, then each pair of alternate exterior angles is congruent
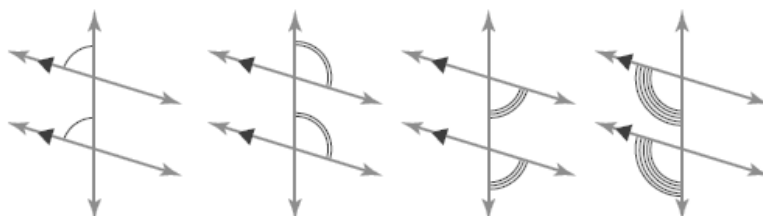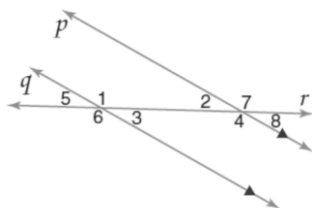

$$\angle 1 \cong \angle 7$$
$$\angle 2 \cong \angle 8$$

Postulate 1

If two parallel lines are cut by a transversal, then each pair of corresponding angles is congruent

Example 1: In the figure, $p \parallel q$, and r is a transversal. If $m\angle 5 = 28^0$, find :

a) $m\angle 1$

$\angle 1$ and $\angle 5$ are supplementary angles

$m\angle 1 + m\angle 5 = 180°$

$\Rightarrow m\angle 1 = 180° - m\angle 5$

$\Rightarrow m\angle 1 = 180° - 28° = 152°$

b) $m\angle 2$

$\angle 5$ and $\angle 2$ are corresponding angles
$\angle 5 \cong \angle 2$

$\Rightarrow m\angle 2 = m\angle 5 = 28°$

c) $m\angle 8$

$\angle 5$ and $\angle 8$ are alternate exterior angles
$\angle 5 \cong \angle 8$

$\Rightarrow m\angle 8 = m\angle 5 = 28°$