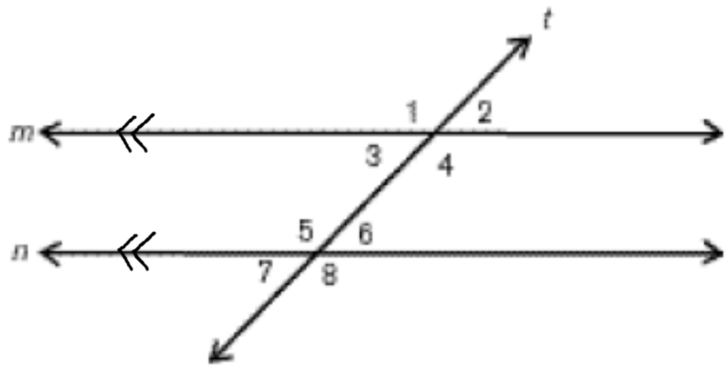
Proving Angle Relationships and Parallel Lines in the Euclidean Plane

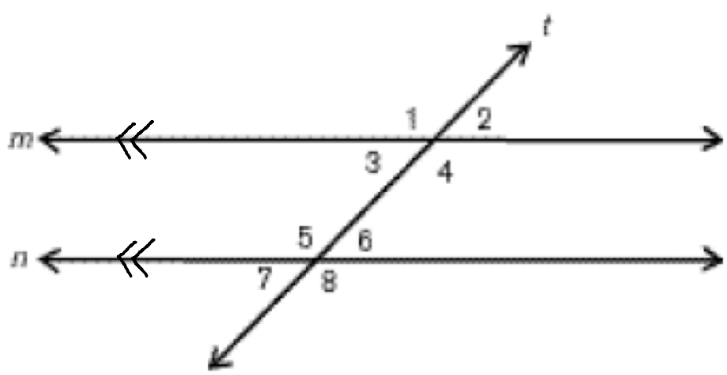
Task A



Given: $m \parallel n$
Prove: $\angle 2 \cong \angle 7$
(Hint: remember that corresponding angles are congruent as an assumption, and that we have proven vertical angles are always congruent)

Theorem: If parallel lines are cut by a transversal, then

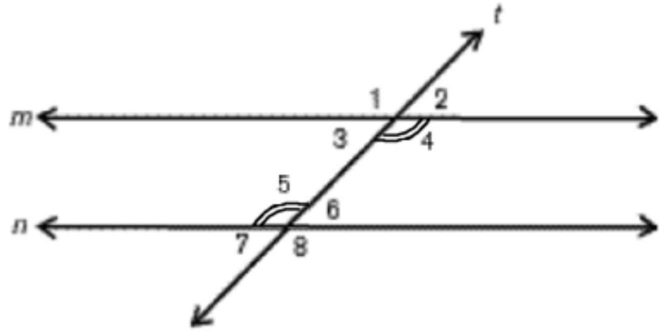
Task B:



Given: $m \parallel n$
Prove: $\angle 3 + \angle 5 = 180°$
(Hint: Corresponding angles of parallel lines are congruent as an assumption, and note $\angle 1 + \angle 3 = 180°$)

Theorem: If parallel lines are cut by a transversal, then

Task C:



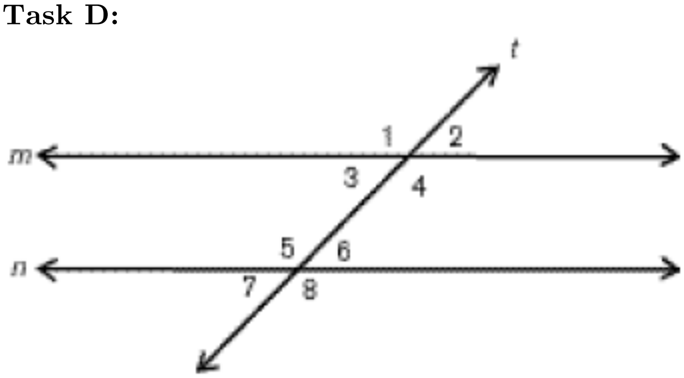
Given: $\angle 5 \cong \angle 4$

Prove: $m \parallel n$

(Hint: We have proven that vertical angles are congruent, and have postulated that lines are parallel if and only if their corresponding angles are congruent.)

Theorem: If lines cut by a transversal form congruent alternate interior angles, then

Task D:



Given: $\angle 4 + \angle 6 = 180°$

Prove: $m \parallel n$

(Hint: Note that $\angle 2 + \angle 4 = 180°$, and have postulated that lines are parallel if and only if their corresponding angles are congruent.)

Theorem: If lines cut by a transversal form supplementary same-side interior angles, then