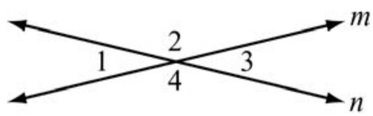
REVIEW EXAMPLES

1. In this diagram, line *m* intersects line *n*.



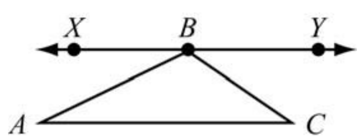
Write a two-column proof to show that vertical angles $\angle 1$ and $\angle 3$ are congruent.

Solution:

Construct a proof using intersecting lines.

Step	Statement	Justification
1	Line *m* intersects line *n*.	Given
2	$\angle 1$ and $\angle 2$ form a linear pair. $\angle 2$ and $\angle 3$ form a linear pair.	Definition of a linear pair
3	$m\angle 1 + m\angle 2 = 180°$ $m\angle 2 + m\angle 3 = 180°$	Angles that form a linear pair have measures that sum to 180°.
4	$m\angle 1 + m\angle 2 = m\angle 2 + m\angle 3$	Substitution
5	$m\angle 1 = m\angle 3$	Subtraction Property of Equality
6	$\angle 1 \cong \angle 3$	Definition of congruent angles

2. In this diagram, $\overleftrightarrow{XY}$ is parallel to $\overline{AC}$, and point B lies on $\overleftrightarrow{XY}$.



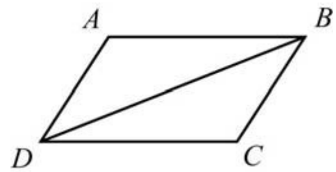
Write a paragraph to prove that the sum of the angles in a triangle is 180°.

Solution:

$\overline{AC}$ and $\overleftrightarrow{XY}$ are parallel, so $\overline{AB}$ is a transversal. The alternate interior angles formed by the transversal are congruent. So, $m\angle A = m\angle ABX$. Similarly, $\overline{BC}$ is a transversal, so $m\angle C = m\angle CBY$. The sum of the angle measures that make a straight line is 180°.

So, $m\angle ABX + m\angle ABC + m\angle CBY = 180°$. Now, substitute $m\angle A$ for $m\angle ABX$ and $m\angle C$ for $m\angle CBY$ to get $m\angle A + m\angle ABC + m\angle C = 180°$.

3. In this diagram, *ABCD* is a parallelogram and $\overline{BD}$ is a diagonal.



Write a two-column proof to show that $\overline{AB}$ and $\overline{CD}$ are congruent.

Solution:

Construct a proof using properties of the parallelogram and its diagonal.

Step	Statement	Justification
1	*ABCD* is a parallelogram.	Given
2	$\overline{BD}$ is a diagonal.	Given
3	$\overline{AB}$ is parallel to $\overline{DC}$. $\overline{AD}$ is parallel to $\overline{BC}$.	Definition of parallelogram
4	$\angle ABD \cong \angle CDB$ $\angle DBC \cong \angle BDA$	Alternate interior angles are congruent.
5	$\overline{BD} \cong \overline{BD}$	Reflexive Property of Congruence
6	$\triangle ADB \cong \triangle CBD$	ASA
7	$\overline{AB} \cong \overline{CD}$	CPCTC

Note: Corresponding parts of congruent triangles are congruent.