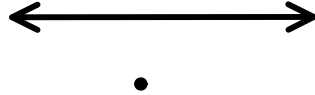


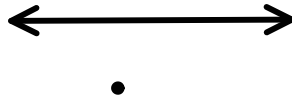
Proving Lines are Parallel and Perpendicular

Postulates

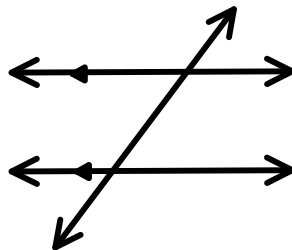
Parallel Postulate - If there is a line and a point not on the line, then there is exactly one line through the point parallel to the given line.



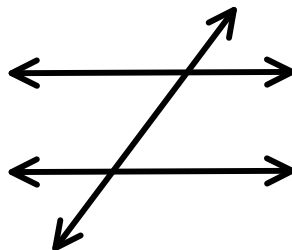
Perpendicular Postulate - If there is a line and a point not on the line then there is exactly one line through the point perpendicular to the given line.



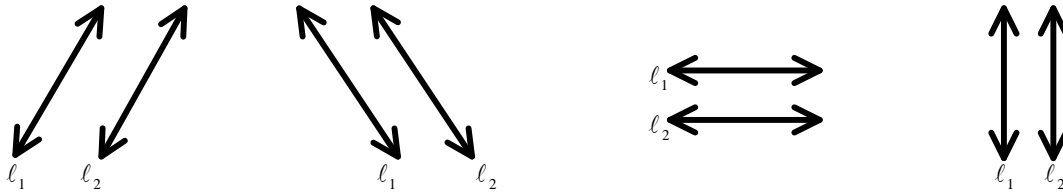
Corresponding Angles Postulate - If two parallel lines are cut by a transversal, then the pairs of corresponding angles are congruent.



Corresponding Angles Converse - If two lines are cut by a transversal so that corresponding angles are congruent, then the lines are parallel.



Slopes of Parallel Lines - In a coordinate plane, two nonvertical lines are parallel if and only if they have the same slope. Any two vertical lines are parallel.

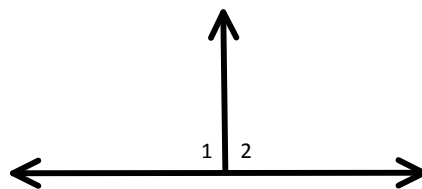


Slopes of Perpendicular Lines - In a coordinate plane, two nonvertical lines are perpendicular if and only if the product of their slopes are -1 . Vertical and horizontal lines are perpendicular.

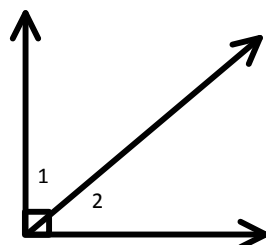


Theorems

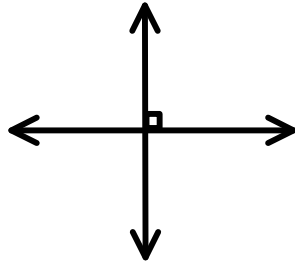
If two lines intersect to form a linear pair of congruent angles, then the lines are perpendicular.



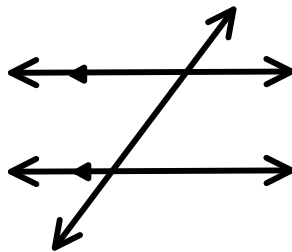
If two sides of two adjacent acute angles are perpendicular, then the angles are complementary.



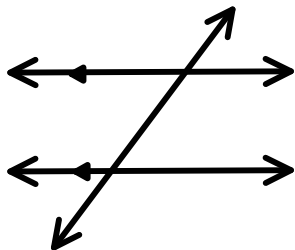
If two lines are perpendicular, then they intersect to form four right angles.



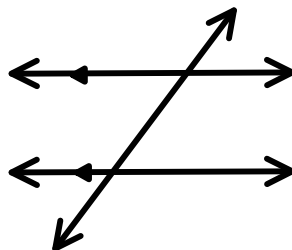
Alternate Interior Angles - If two parallel lines are cut by a transversal, then the pairs of alternate interior angles are congruent.



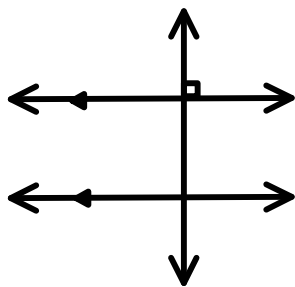
Consecutive Interior Angles - If two parallel lines are cut by a transversal, then the pairs of consecutive interior angles are supplementary.



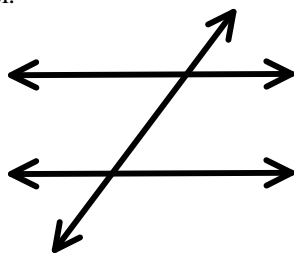
Alternate Exterior Angles - If two parallel lines are cut by a transversal, then the pairs of alternate exterior angles are congruent.



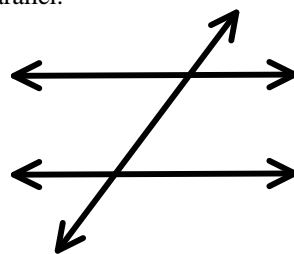
Perpendicular Transversal - If a transversal is perpendicular to one of two parallel lines, then it is perpendicular to the other.



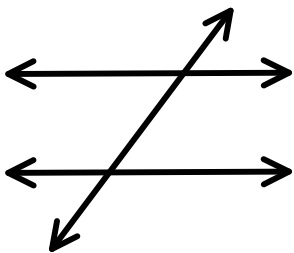
Alternate Interior Angles Converse - If two lines are cut by a transversal so that alternate interior angles are congruent, then the lines are parallel.



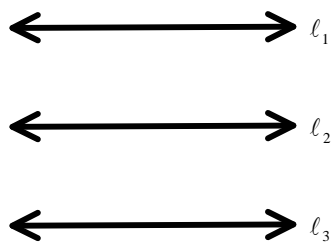
Consecutive Interior Angles Converse - If two lines are cut by a transversal so that consecutive interior angles are supplementary, then the lines are parallel.



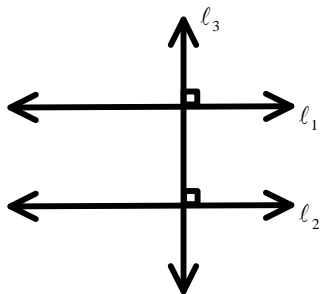
Alternate Exterior Angles Converse - If two lines are cut by a transversal so that alternate exterior angles are congruent, then the lines are parallel.



If two lines are parallel to the same line, then they are parallel to each other.



In a plane, if two lines are perpendicular to the same line, then they are parallel to each other.



Directions: Write a proof for each.

1. Given: $\angle 1$ and $\angle 2$ are supplementary

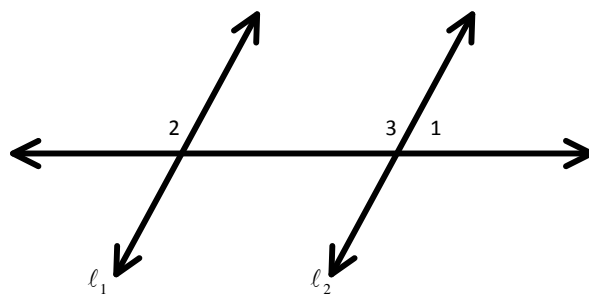
Prove: $\ell_1 \parallel \ell_2$

Statement

1. $\angle 1$ and $\angle 2$ are supplementary

Reason

1. Given



2. Given: $a \parallel b$, $\angle 1 \cong \angle 2$

Prove: $c \parallel d$

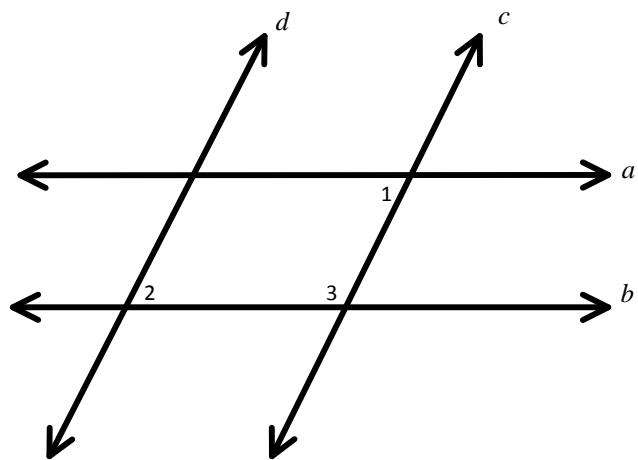
Statement

1. $a \parallel b$

$\angle 1 \cong \angle 2$

Reason

1. Given



3. Given: $\overline{AB} \parallel \overline{DE}$, $\angle 4 \cong \angle 3$

Prove: $\angle 1 \cong \angle 5$

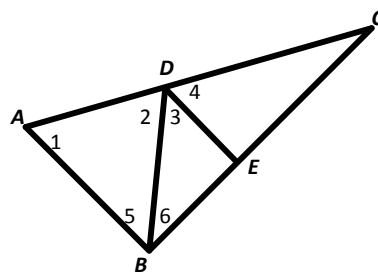
Statement

1. $\overline{AB} \parallel \overline{DE}$

$\angle 4 \cong \angle 3$

Reason

1. Given



4. Given: $\angle 2 \cong \angle 1$, $\angle 1 \cong \angle 3$

Prove: $\overline{AB} \parallel \overline{CD}$

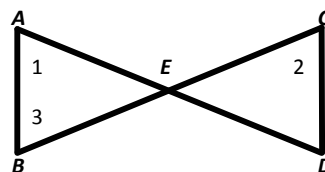
Statement

1. $\angle 2 \cong \angle 1$

$\angle 1 \cong \angle 3$

Reason

1. Given



5. Given: $\overline{AB} \perp \overline{CB}$, $\angle 1 \cong \angle 2$

Prove: $\overline{DC} \perp \overline{CB}$

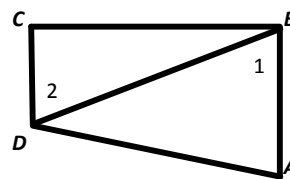
Statement

1. $\overline{AB} \perp \overline{CB}$

$\angle 1 \cong \angle 2$

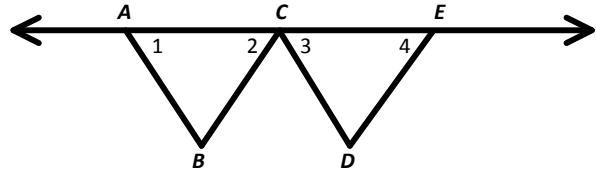
Reason

1. Given



6. Given: $\overline{AB} \parallel \overline{CD}$, $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$

Prove: $\overline{BC} \parallel \overline{DE}$



Statement

1. $\overline{AB} \parallel \overline{CD}$

$\angle 1 \cong \angle 2$

$\angle 3 \cong \angle 4$

Reason

1. Given