Writing Proofs

Jonathan R. Bacolod

Sauyo High School

What is a Proof?

Proof: a form of logical reasoning in which each statement is organized and backed up by the reasons

What are the Ways of Writing Proofs?

What are the Ways of Writing Proofs?

1. Flow-Chart Proof

What are the Ways of Writing Proofs?

1. Flow-Chart Proof
2. Two-Column Proof

What are the Ways of Writing Proofs?

1. Flow-Chart Proof
2. Two-Column Proof
3. Paragraph Form Proof

Definitions of Geometric Terms

Definitions of Geometric Terms

1. Definition of Betweenness: If B is between $\overline{AC}$, then $\overline{AC} = AB + BC$.

Definitions of Geometric Terms

1. Definition of Betweenness: If B is between $\overline{AC}$, then $\overline{AC} = AB + BC$.
2. Midpoint: If B is the midpoint of $\overline{AC}$, then $AB = BC$.

Definitions of Geometric Terms

1. Definition of Betweenness: If B is between $\overline{AC}$, then $\overline{AC} = AB + BC$.
2. Midpoint: If B is the midpoint of $\overline{AC}$, then $AB = BC$.
3. Segment Bisector: If a line, ray or another segment bisects the segment AB at X, then $AX \cong BX$.

Definitions of Geometric Terms

1. Definition of Betweenness: If B is between $\overline{AC}$, then $\overline{AC} = AB + BC$.
2. Midpoint: If B is the midpoint of $\overline{AC}$, then $AB = BC$.
3. Segment Bisector: If a line, ray or another segment bisects the segment AB at X, then $AX \cong BX$.
4. Right Angle: If $\angle A$ is a right angle, then $m\angle A = 90^\circ$.

Definitions of Geometric Terms

1. Definition of Betweenness: If B is between $\overline{AC}$, then $\overline{AC} = AB + BC$.
2. Midpoint: If B is the midpoint of $\overline{AC}$, then $AB = BC$.
3. Segment Bisector: If a line, ray or another segment bisects the segment AB at X, then $AX \cong BX$.
4. Right Angle: If $\angle A$ is a right angle, then $m\angle A = 90^\circ$.
5. Perpendicular Line Segments: If $\overline{AB} \perp \overline{AC}$, then $\angle BAC$ is a right angle.

Definitions of Geometric Terms

1. Definition of Betweenness: If B is between $\overline{AC}$, then $\overline{AC} = AB + BC$.
2. Midpoint: If B is the midpoint of $\overline{AC}$, then $AB = BC$.
3. Segment Bisector: If a line, ray or another segment bisects the segment AB at X, then $AX \cong BX$.
4. Right Angle: If $\angle A$ is a right angle, then $m\angle A = 90^\circ$.
5. Perpendicular Line Segments: If $\overline{AB} \perp \overline{AC}$, then $\angle BAC$ is a right angle.
6. Complementary Angles: If $\angle A$ and $\angle B$ are complementary angles, then $m\angle A + m\angle B = 90^\circ$.

Definitions of Geometric Terms

Definitions of Geometric Terms

7. Supplementary Angles: If $\angle A$ and $\angle B$ are supplementary angles, then $m\angle A + m\angle B = 180^\circ$.

Definitions of Geometric Terms

7. Supplementary Angles: If $\angle A$ and $\angle B$ are supplementary angles, then $m\angle A + m\angle B = 180^\circ$.
8. Linear Pair: If two angles are adjacent such that two of the rays are opposite, then they form a linear pair.

Definitions of Geometric Terms

7. Supplementary Angles: If $\angle A$ and $\angle B$ are supplementary angles, then $m\angle A + m\angle B = 180^\circ$.
8. Linear Pair: If two angles are adjacent such that two of the rays are opposite, then they form a linear pair.
9. Definition of Congruent Segments: If $\overline{AB} \cong \overline{CD}$, then $AB = CD$.

Definitions of Geometric Terms

7. Supplementary Angles: If $\angle A$ and $\angle B$ are supplementary angles, then $m\angle A + m\angle B = 180^\circ$.
8. Linear Pair: If two angles are adjacent such that two of the rays are opposite, then they form a linear pair.
9. Definition of Congruent Segments: If $\overline{AB} \cong \overline{CD}$, then $AB = CD$.
10. Definition of Congruent Angles: If $\angle A \cong \angle B$, then $m\angle A = m\angle B$.

Properties of Equality

Properties of Equality

1. Addition Property of Equality: If $a = b$, then $a + c = b + c$.

Properties of Equality

1. Addition Property of Equality: If $a = b$, then $a + c = b + c$.
2. Subtraction Property of Equality: If $a = b$, then $a - c = b - c$.

Properties of Equality

1. Addition Property of Equality: If $a = b$, then $a + c = b + c$.
2. Subtraction Property of Equality: If $a = b$, then $a - c = b - c$.
3. Multiplication Property of Equality: If $a = b$, then $ac = bc$.

Properties of Equality

1. Addition Property of Equality: If $a = b$, then $a + c = b + c$.
2. Subtraction Property of Equality: If $a = b$, then $a - c = b - c$.
3. Multiplication Property of Equality: If $a = b$, then $ac = bc$.
4. Division Property of Equality: If $a = b$ and $c \neq 0$, then $\frac{a}{c} = \frac{b}{c}$.

Properties of Equality

Properties of Equality

5. Reflexive Property of Equality: If a is any real number, then $a = a$.

Properties of Equality

5. Reflexive Property of Equality: If a is any real number, then $a = a$.
6. Symmetric Property: If $a = b$,then $b = a$.

Properties of Equality

5. Reflexive Property of Equality: If a is any real number, then $a = a$.
6. Symmetric Property: If $a = b$,then $b = a$.
7. Transitive Property: If $a = b$ and $b = c$, then $a = c$.

Properties of Equality

5. Reflexive Property of Equality: If a is any real number, then $a = a$.
6. Symmetric Property: If $a = b$,then $b = a$.
7. Transitive Property: If $a = b$ and $b = c$, then $a = c$.
8. Substitution Property: If $a + b = c$ and $b = x$, then $a + x = c$.

Properties of Congruence

Properties of Congruence

1. Reflexive Property of Equality: Any angle or segment is congruent to itself ($\overline{AB} \cong \overline{AB}$).

Properties of Congruence

1. Reflexive Property of Equality: Any angle or segment is congruent to itself ($\overline{AB} \cong \overline{AB}$).
2. Symmetric Property: If $\angle A \cong \angle B$, then $\angle B \cong \angle A$.

Properties of Congruence

1. Reflexive Property of Equality: Any angle or segment is congruent to itself ($\overline{AB} \cong \overline{AB}$).
2. Symmetric Property: If $\angle A \cong \angle B$, then $\angle B \cong \angle A$.
3. Transitive Property: If $\angle A \cong \angle B$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$.

What is a Postulate?

Postulate: a statement that is accepted without proof

Some Postulates in Geometry

Some Postulates in Geometry

1. Linear Pair Postulate: If two angles form a linear pair, then they are supplementary.

Some Postulates in Geometry

1. Linear Pair Postulate: If two angles form a linear pair, then they are supplementary.
2. Segment Addition Postulate: If B lies on $\overline{AC}$, then $AC = AB + BC$.

Some Postulates in Geometry

1. Linear Pair Postulate: If two angles form a linear pair, then they are supplementary.
2. Segment Addition Postulate: If B lies on $\overline{AC}$, then $AC = AB + BC$.
3. Angle Addition Postulate: If B is in the interior of $\angle AOC$, then $m\angle AOC = m\angle AOB + m\angle BOC$.

What is a Theorem?

Theorem: a statement that is accepted after it is proved deductively

Some Theorems in Geometry

Some Theorems in Geometry

1. Vertical Angle Theorem: If two angles are vertical, then they are congruent.

Some Theorems in Geometry

1. Vertical Angle Theorem: If two angles are vertical, then they are congruent.
2. Complementary Theorem: If two angles are complement of the same (or congruent) angles, then they are congruent.

Some Theorems in Geometry

1. Vertical Angle Theorem: If two angles are vertical, then they are congruent.
2. Complementary Theorem: If two angles are complement of the same (or congruent) angles, then they are congruent.
3. Supplement Theorem: If two angles are supplement of the same (or congruent) angles, then they are congruent.

Thank you for watching.