

Geometry CC - Unit 5  
Lesson 1: Intro to Proofs  
M1 L22-27

**DO NOW:** Fill in the blank with the correct word that fits the definition.

Segment Bisector	Altitude	Supplementary Angles
Angle Bisector	Midpoint	Complementary Angles
Perpendicular Lines	Vertical Angles	Median
Linear Pair		

- The midpoint is the point on that line segment that divides the segment into two congruent segments.
- A segment bisector is any line or part of a line that intersects a line segment at its midpoint.
- A median is a line segment extending from any vertex of a triangle to the midpoint of the opposite side.
- An angle bisector is a ray whose endpoint is the vertex of the angle and which divides the angle into two congruent angles.
- Perpendicular lines are two lines which intersect to form right angles.
- Altitudes are line segments extending from any vertex of a triangle, perpendicular to the line containing the opposite side.
- Vertical angles are two nonadjacent angles formed by two intersecting lines.
- Complementary angles are two angles, the sum of whose measures is  $90^\circ$ .
- Supplementary angles are two angles, the sum of whose measures is  $180^\circ$ .
- A linear pair are adjacent supplementary angles.

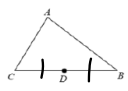
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**Why Study Proofs?** You use proofs every day, without knowing it. Geometry is logical and it teaches you how to think and prove that things are so, step by step by step. Proofs are excellent lessons in reasoning. Without logic and reasoning, you are dependent on jumping to conclusions or - worse - having empty opinions.

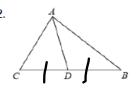
A geometry proof is a logical argument that establishes the truth of a statement.

**Two-column Proofs**

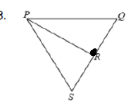
For each question, draw a conclusion based on the given information (use the vocabulary on the front to help guide you).

Statements	Reasons
<p>1. </p> <p>1. D is the midpoint of <math>\overline{CB}</math>.</p> <p>2. <math>\overline{CD} \cong \overline{DB}</math></p>	<p>1. Given</p> <p>2. A midpoint divides a segment into 2 <math>\cong</math> segments</p>

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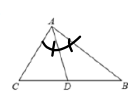
2. 

Statements	Reasons
<p>1. <math>\overline{AD}</math> bisects <math>\overline{CB}</math>.</p> <p>2. <math>\overline{CD} \cong \overline{DB}</math></p>	<p>1. Given</p> <p>2. A segment bisector divides a segment into 2 <math>\cong</math> segments.</p>

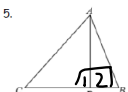
3. 

Statements	Reasons
<p>1. <math>\overline{PR}</math> is a median in <math>\triangle PQS</math>.</p> <p>2. R is a midpoint</p>	<p>1. Given</p> <p>2. A median is a line drawn from a vertex to the midpoint on the opposite side</p>

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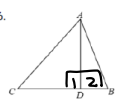
4. 

Statements	Reasons
<p>1. <math>\overline{AD}</math> bisects <math>\angle CAB</math>.</p> <p>2. <math>\angle CAD \cong \angle BAD</math></p>	<p>1. Given</p> <p>2. An <math>\angle</math> bisector divides an <math>\angle</math> into 2 <math>\cong</math> <math>\angle</math>'s.</p>

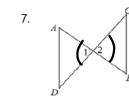
5. 

Statements	Reasons
<p>1. <math>\overline{AD}</math> is an altitude in <math>\triangle ABC</math>.</p> <p>2. <math>\overline{AD} \perp \overline{CB}</math></p>	<p>1. Given</p> <p>2. An altitude is a line drawn from a vertex <math>\perp</math> to the opposite side.</p>

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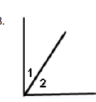
6. 

Statements	Reasons
<p>1. <math>\overline{AD} \perp \overline{CB}</math></p> <p>2. <math>\angle 1</math> &amp; <math>\angle 2</math> are <math>\angle</math>'s</p>	<p>1. Given</p> <p>2. <math>\perp</math> lines form <math>\angle</math>'s.</p>


7. 

Statements	Reasons
<p>1. <math>\overline{AD}</math> and <math>\overline{CB}</math> intersect.</p> <p>2. <math>\angle 1 \cong \angle 2</math></p>	<p>1. Given</p> <p>2. Vertical <math>\angle</math>'s are <math>\cong</math>.</p>

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8. 

Statements	Reasons
<p>1. <math>\angle 1</math> and <math>\angle 2</math> are complementary.</p> <p>2. <math>\angle 1 + \angle 2 = 90^\circ</math></p>	<p>1. Given</p> <p>2. Complementary <math>\angle</math>'s sum to <math>90^\circ</math></p>

9. 

Statements	Reasons
<p>1. <math>\angle 5 \cong \angle 8</math></p> <p>2. <math>\angle 5 \cong \angle 6</math></p> <p>3. <math>\angle 6 \cong \angle 7</math></p>	<p>1. Given</p> <p>2. Linear pairs are supplementary are supplementary</p> <p>3. Supplements of <math>\cong</math> <math>\angle</math>'s are <math>\cong</math>.</p>

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10.

S	R
1. $\angle 1 \cong \angle 4$	1. Given
2. $\angle 1$ & $\angle 2$ are Complementary $\angle 3$ & $\angle 4$ are Complementary	2. Complementary 4's Sum to $90^\circ$
3. $\angle 2 \cong \angle 3$	3. Complements of $\cong$ are $\cong$ .

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