Module 6 – Reasoning and Proof

Lesson 1 – Types of Reasoning

Name _____

Fill in the blanks.

1. A _____ is a statement that is assumed true without proof.
2. A _____ is a statement that needs to be proven before it is accepted.
3. Two methods that are used to prove theorems are the _____ and the _____.

State which property supports the conclusion made in each statement.

1. If AB = CD, then CD = AB _____
2. If Q is between A and T, then AQ + QT = AT _____
3. If AB = CD + DT and CD + DT = CT, then AB = CT _____
4. If AC = AB + BC and BD > AC, then BD > AB + BC _____
5. If AQ = BR, then AQ + CT > BR + CT _____

Complete the following proof.

Given: $AC = BD$
Prove: $\overline{AB} \cong \overline{CD}$

Statements	Reasons
1.	1.
2. AC = AB + BC	2.
3.	3. Transitive Property of Equality
4. BD = BC + CD	4.
5.	5. Addition Property of Equality
6. AB = CD	6.
7. $\overline{AB} \cong \overline{CD}$	7.

Properties of Real Numbers

A) Properties of Equality

1) Reflexive Property	a = a
2) Symmetric Property of Equality	If a = b, then b = a
3) Transitive Property of Equality	If a = b and b = c, then a = c
4) Addition Property of Equality	If a = b and c = d, then a + c = b + d
5) Subtraction Property of Equality	If a = b and c = d, then a – c = b - d
6) Multiplication Property of Equality	If a = b and c = d, then ac = bd

B) Properties of Inequality

1) Transitive Property of Inequality	If a > b and b > c, then a > c
2) Addition Property of Inequality	If a > b, then a + c > b + c
3) Multiplication Property of Inequality	If a > b and c > 0, then ac > bc
	If a > b and c < 0, then ac < bc

Substitution Principle

If a = b than *a* may be replaced by *b* in any equations or inequality, or vice versa.

Congruent Segments

If the length of PQ is equal to the length of RS, then PQ is congruent to RS.

Betweenness

Point O is between point B and Y, in symbol B-O-Y, if and only if it satisfies the following conditions:

- B, O, and Y are collinear and distinct points
- BO + OY = BY