

Bellwork

09/16/2011

1. Solve. Give a reason for each step.
 $-5x+18=3x-38$

Geometry

2.6 Prove Statement About Segments and Angles

Standard(s): 7

Vocabulary:

1. **Proof:** A logical argument that shows a statement is true.
2. **Two-Column Proof:** Numbered statements and corresponding reasons that show an argument in logical order.
3. **Theorem:** A statement that has been proven.

CONCEPT SUMMARY
For Your Notebook

Writing a Two-Column Proof

In a proof, you make one statement at a time, until you reach the conclusion. Because you make statements based on facts, you are using deductive reasoning. Usually the first statement-and-reason pair you write is given information.

GIVEN $\triangleright \angle 1 \cong \angle 2$

PROVE $\triangleright \angle 2 \cong \angle 1$

Copy or draw diagrams and label given information to help develop proofs.

Proof of the Symmetric Property of Angle Congruence

STATEMENTS	REASONS
1. $\angle 1 \cong \angle 2$	1. Given
2. $m\angle 1 = m\angle 2$	2. Definition of congruent angles
3. $m\angle 2 = m\angle 1$	3. Symmetric Property of Equality
4. $\angle 2 \cong \angle 1$	4. Definition of congruent angles

Statements based on facts that you know or on conclusions from deductive reasoning

The number of statements will vary.

Remember to give a reason for the last statement.

Definitions, postulates, or proven theorems that allow you to state the corresponding statement

Def. of Congruent Segments

$$AB=CD \quad \text{iff} \quad \overline{AB} \cong \overline{CD}$$

Def. of Congruent Angles

$$m\angle 1=m\angle 2 \quad \text{iff} \quad \angle 1 \cong \angle 2$$

Def. of Complementary Angles

$$\angle 1 \text{ and } \angle 2 \text{ are complementary iff } m\angle 1+m\angle 2=90^\circ$$

Def. of Supplementary Angles

$$\angle 1 \text{ and } \angle 2 \text{ are supplementary iff } m\angle 1+m\angle 2=180^\circ$$

Name the Property Shown

Name the property illustrated by each statement.

A. If $\angle RST \cong \angle MNP$, then $\angle MNP \cong \angle RST$.

Symmetric Property

B. If $\overline{AB} \cong \overline{FG}$ and $\overline{FG} \cong \overline{MN}$, then $\overline{AB} \cong \overline{MN}$.

Transitive Property

***Why is the reason for part B the Transitive Property of Segment Congruence and not the Transitive Property of Equality?**

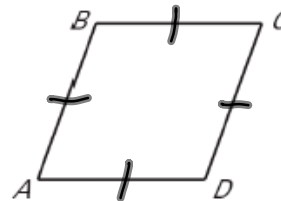
Complete a Proof

Complete the proof.

The lengths of the sides of quadrilateral $ABCD$ are equal. Prove that the perimeter of $ABCD$ is equal to $4AB$.

GIVEN: $\overline{AB} \cong \overline{BC}$, $\overline{BC} \cong \overline{CD}$, $\overline{CD} \cong \overline{AD}$

PROVE: Perimeter of $ABCD = 4AB$

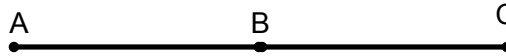


Statements	Reasons
1. $\overline{AB} \cong \overline{BC}$, $\overline{BC} \cong \overline{CD}$, $\overline{CD} \cong \overline{AD}$	1. ? Given
2. $\left[\begin{array}{l} \overset{1}{AB} = \overset{2}{BC}, \overset{2}{BC} = \overset{3}{CD}, \overset{3}{CD} = AD \end{array} \right]$	2. ? Def. of \cong segments
3. $\left[\begin{array}{l} \overset{1}{AB} = \overset{2}{CD}, \overset{2}{AB} = AD \end{array} \right]$	3. ? Transitive Prop.
4. Perimeter of $ABCD = AB + BC + CD + AD$	4. ? Def. of Perimeter
5. $\frac{?}{AB} = \text{Perimeter of } ABCD$	5. Substitution Property of Equality
6. $\frac{?}{AB} = AB + AB + AB + AB$	6. Simplify.
Perimeter of $ABCD = 4(AB)$	

Write a Two-Column Proof

Given: $AC = AB + AB$

Prove: $AB = BC$



Statements	Reasons
1. $AC = AB + AB$	1. Given
2. $AC = [AB + BC]$	2. Segment Add. Post.
3. $AB + BC = AB + AB$	3. Substitution Prop. of $=$
4. $BC = AB$	4. Subtraction Prop.
5. $AB = BC$	5. Symmetric Prop. of $=$

In the diagram, $RT = SU$. Write a two-column proof showing $RS = TU$.

Given:

Prove:



Statements	Reasons

Homework Assignment

Worksheet 2.6B

