

BELLWORK

Find the complement and the supplement of the angle
measure. 90° 180°

1. 59°

$$\begin{aligned} C: & 31^\circ \\ S: & 121^\circ \end{aligned}$$

2. 20°

$$\begin{aligned} C: & 70^\circ \\ S: & 160^\circ \end{aligned}$$

3. 53°

$$\begin{aligned} C: & 37^\circ \\ S: & 127^\circ \end{aligned}$$

4. 22.6°

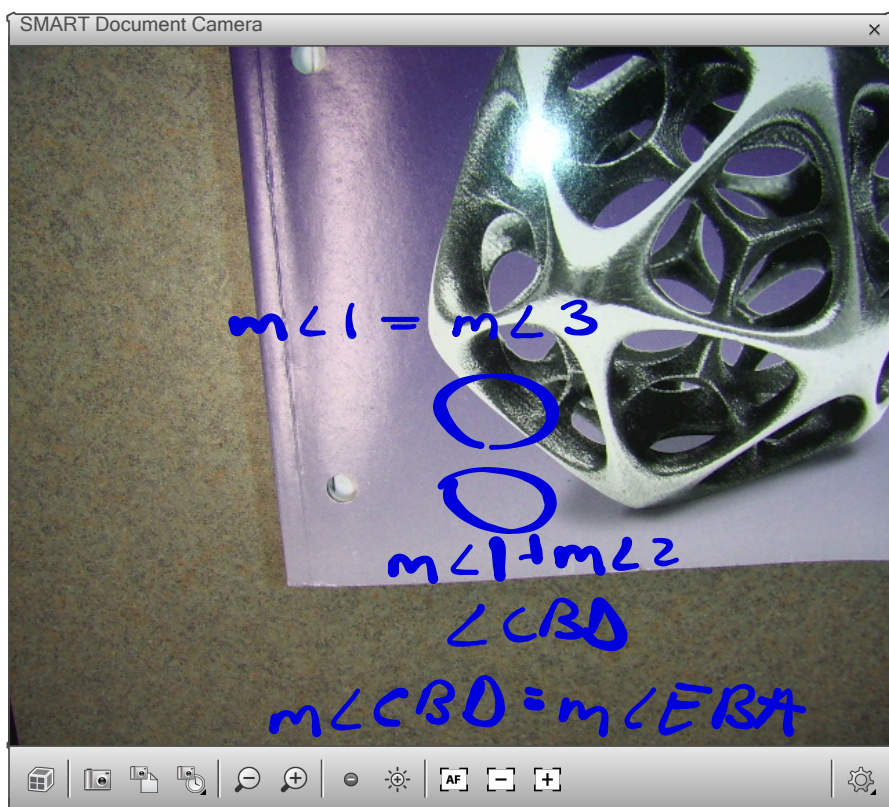
$$\begin{aligned} C: & 67.4^\circ \\ S: & 157.4^\circ \end{aligned}$$

5. 28°

$$\begin{aligned} C: & 52^\circ \\ S: & 152^\circ \end{aligned}$$

6. 74°

$$\begin{aligned} C: & 16^\circ \\ S: & 106^\circ \end{aligned}$$



Name the property that the statement illustrates.

a. $\angle A \cong \angle A$

b. If $\overline{PQ} \cong \overline{JG}$ and $\overline{JG} \cong \overline{XY}$, then
 $\overline{PQ} \cong \overline{XY}$.

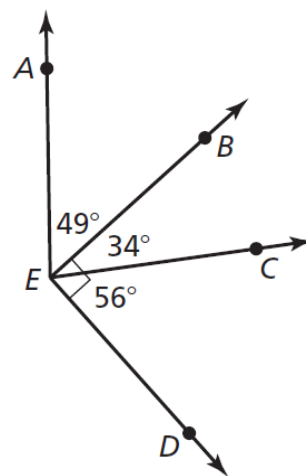
Use the figure.

1. Name a pair of adjacent complementary angles.

2. Find $m\angle AEC$.

3. Find $m\angle AED$.

4. Find $m\angle BED$.



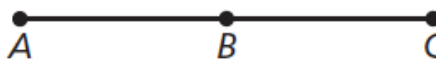
Essential Question

How can you prove a mathematical statement?

Work with a partner. Four steps of a proof are shown. Write the reasons for each statement.

Given $AC = AB + AB$

Prove $AB = BC$



STATEMENTS

REASONS

1. $AC = AB + AB$

1. Given

2. $AB + BC = AC$

2.

3. $AB + AB = AB + BC$

3.

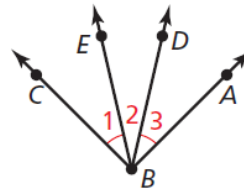
4. $AB = BC$

4.

Work with a partner. Six steps of a proof are shown. Complete the statements that correspond to each reason

Given $m\angle 1 = m\angle 3$

Prove $m\angle EBA = m\angle CBD$

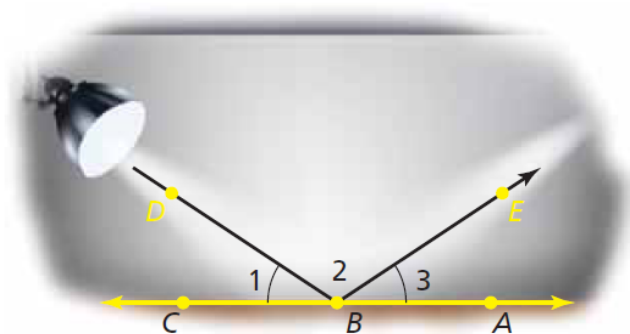


STATEMENTS	REASONS
1. <input type="text"/>	1. Given
2. $m\angle EBA = m\angle 2 + m\angle 3$	2. Angle Addition Postulate (Post.1.4)
3. $m\angle EBA = m\angle 2 + m\angle 1$	3. Substitution Property of Equality
4. $m\angle EBA =$ <input type="text"/>	4. Commutative Property of Addition
5. $m\angle 1 + m\angle 2 =$ <input type="text"/>	5. Angle Addition Postulate (Post.1.4)
6. <input type="text"/>	6. Transitive Property of Equality

Write a two-column proof for the situation in Example 4 from the Section 2.4 lesson.

Given $m\angle 1 = m\angle 3$

Prove $m\angle DBA = m\angle EBC$

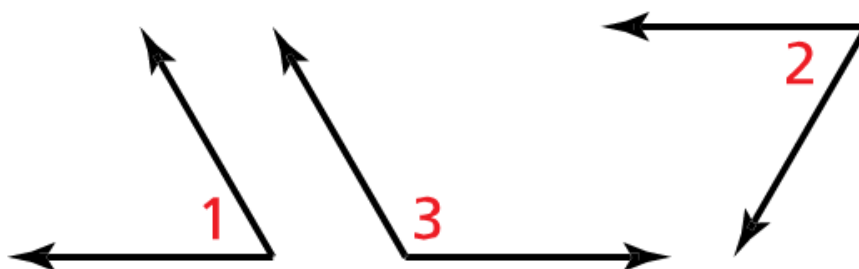


Write a two-column proof.

Given $\angle 1$ is supplementary to $\angle 3$.

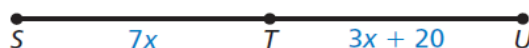
$\angle 2$ is supplementary to $\angle 3$.

Prove $\angle 1 \cong \angle 2$



Six steps of a two-column proof are shown. Copy and complete the proof.

Given T is the midpoint of \overline{SU} .



Prove $x = 5$

STATEMENTS	REASONS
1. T is the midpoint of \overline{SU} .	1. _____
2. $\overline{ST} \cong \overline{TU}$	2. Definition of midpoint
3. $ST = TU$	3. Definition of congruent segments
4. $7x = 3x + 20$	4. _____
5. _____	5. Subtraction Property of Equality
6. $x = 5$	6. _____

Theorems

~~Theorem~~ **Properties of Segment Congruence**

Segment congruence is reflexive, symmetric, and transitive.

Reflexive For any segment AB , $\overline{AB} \cong \overline{AB}$.

Symmetric If $\overline{AB} \cong \overline{CD}$, then $\overline{CD} \cong \overline{AB}$.

Transitive If $\overline{AB} \cong \overline{CD}$ and $\overline{CD} \cong \overline{EF}$, then $\overline{AB} \cong \overline{EF}$.

Proofs Ex. 11, p. 103; Example 3, p. 101; Chapter Review 2.5 Example, p. 118

~~Theorem 2.2~~ **Properties of Angle Congruence**

Angle congruence is reflexive, symmetric, and transitive.

Reflexive For any angle A , $\angle A \cong \angle A$.

Symmetric If $\angle A \cong \angle B$, then $\angle B \cong \angle A$.

Transitive If $\angle A \cong \angle B$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$.

Proofs Ex. 25, p. 118; 2.5 Concept Summary, p. 102; Ex. 12, p. 103

Name the property that the statement illustrates.

a. If $\angle T \cong \angle V$ and $\angle V \cong \angle R$, then $\angle T \cong \angle R$.

Transitive Prop of \angle Congruence

b. If $\overline{JL} \cong \overline{YZ}$, then $\overline{YZ} \cong \overline{JL}$.

Symmetric Prop Segment
Congruence

Write a two-column proof for the Symmetric Property of Segment Congruence.

Given $\overline{LM} \cong \overline{NP}$



Prove $\overline{NP} \cong \overline{LM}$

Statements	Reasons
1. $\overline{LM} \cong \overline{NP}$	1. Given
2. $LM = NP$	2. Prop. Segment Congruence
3. $NP = LM$	3. Symmetric Property
4. $\overline{NP} \cong \overline{LM}$	4. Definition of Segment Congruence

Name the property that the statement illustrates.

1. $\overline{GH} \cong \overline{GH}$

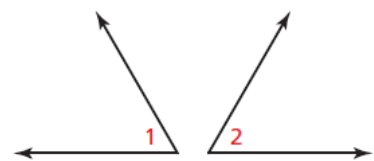
2. If $\angle K \cong \angle P$, then $\angle P \cong \angle K$.

3. Look back at Example 4. What would be different if you were proving that $AB = 2 \cdot MB$ and that $MB = \frac{1}{2}AB$ instead?

Concept Summary

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.



Copy or draw diagrams and label given information to help develop proofs. Do not mark or label the information in the Prove statement on the diagram.

Proof of the Symmetric Property of Angle Congruence

Given $\angle 1 \cong \angle 2$

Prove $\angle 2 \cong \angle 1$

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

STATEMENTS

1. $\angle 1 \cong \angle 2$
2. $m\angle 1 = m\angle 2$
3. $m\angle 2 = m\angle 1$
4. $\angle 2 \cong \angle 1$

The number of statements will vary.

REASONS

1. **Given**
2. Definition of congruent angles
3. Symmetric Property of Equality
4. Definition of congruent angles

Remember to give a reason for the last statement.

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

Prove the Reflexive Property of Segment Congruence. (See Exercise 11.)