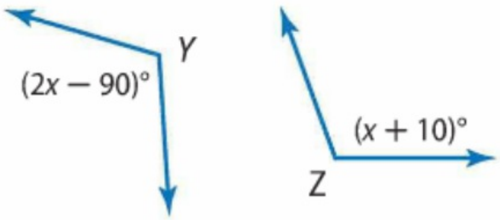
b. The statements for a two-column proof to show that if $m\angle Y = m\angle Z$, then $x = 100$ are given below. Complete the proof by providing the reasons.



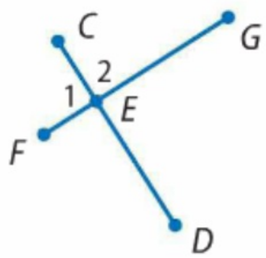
Statements	Reasons
a. $m\angle Y = m\angle Z$, $m\angle Y = 2x - 90$, $m\angle Z = x + 10$	**Given**
b. $2x - 90 = x + 10$	**Substitution**
c. $x - 90 = 10$	**Subtraction Property of Equality**
d. $x = 100$	**Addition Property of Equality**

	Statements	Reasons
a.	$m\angle Y = m\angle Z$, $m\angle Y = 2x - 90$, $m\angle Z = x + 10$	Given
b.	$2x - 90 = x + 10$	Substitution
c.	$x - 90 = 10$	Subtraction Property of Equality
d.	$x = 100$	Addition Property of Equality

Guided Practice

Check

1. Use the figure to complete the paragraph proof. (Example 1)



Given: $m\angle 1 = m\angle 2$, $\angle 1$ and $\angle 2$ are supplementary.

Prove: $\angle 1$ and $\angle 2$ are right angles.

Proof: $m\angle 1 + m\angle 2 =$ 180° since they are supplementary angles. Since $m\angle 1 = m\angle 2$, then $m\angle 1 + m\angle 1 = 180°$ by substitution. Solving the equation gives $m\angle 1 =$ 90°. Since $m\angle 1 = m\angle 2$, then $m\angle 2$ is also 90°. Therefore, $\angle 1$ and $\angle 2$ are right angles.

2. Refer to the figure above. Complete the two-column proof to show that if $EG = 3x - 1$, $ED = 2x + 4$, and $EG = ED$, then $x = 5$. (Example 2)

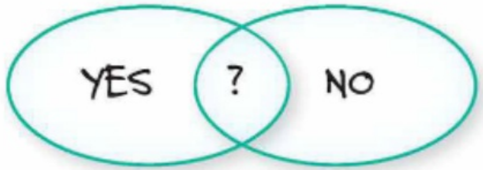
	Statements	Reasons
a.	$EG = 3x - 1$, $ED = 2x + 4$, $EG = ED$	**Given**
b.	$3x - 1 = 2x + 4$	**Substitution**
c.	$x - 1 = 4$	**Subtraction Property of Equality**
d.	$x = 5$	**Addition Property of Equality**

3. **Building on the Essential Question** How is deductive reasoning used in algebra and geometry proofs?

Sample answer: You use facts, definitions, and properties in proofs.

Rate Yourself!

Are you ready to move on? Shade the section that applies.



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Tutor

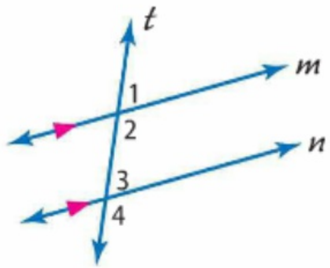
3. **Construct an Argument** Complete the two-column proof to show that if $\angle 1$ and $\angle 2$ are supplementary and $m\angle 1 = m\angle 2$, then $\angle 1$ and $\angle 2$ are right angles. (Example 2)

Given: $\angle 1$ and $\angle 2$ are supplementary; $m\angle 1 = m\angle 2$

Prove: $\angle 1$ and $\angle 2$ are right angles

Statements	Reasons
a. $\angle 1$ and $\angle 2$ are supplementary; $m\angle 1 = m\angle 2$	**Given**
b. $m\angle 1 + m\angle 2 = 180°$	**Definition of supplementary angles**
c. $m\angle 1 + m\angle 1 = 180°$	**Substitution**
d. $2(m\angle 1) = 180°$	**Simplify**
e. $m\angle 1 = 90°$	**Division Property of Equality**
f. $m\angle 2 = 90°$	$m\angle 1 = m\angle 2$ (Given)
g. $\angle 1$ and $\angle 2$ are right angles.	**Definition of right angles**

4. **Construct an Argument** Complete the two-column proof to show that when two parallel lines are cut by a transversal, consecutive interior angles are supplementary.



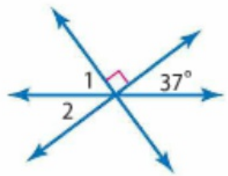
Given: parallel lines *m* and *n* cut by transversal *t*

Prove: ∠2 and ∠3 are supplementary.

	Statements	Reasons
a.	**Lines *m* and *n* are parallel and cut by transversal *t***	Given
b.	∠1 and ∠2 form a straight angle.	**Definition of straight angle**
c.	$m\angle 1 + m\angle 2 = 180$	Definition of supplementary angles
d.	$m\angle 1 = m\angle 3$	**Corresponding ∠s have equal measures**
e.	$m\angle 3 + m\angle 2 = 180$	Substitution
f.	∠2 and ∠3 are supplementary angles	**Definition of supplementary angles**

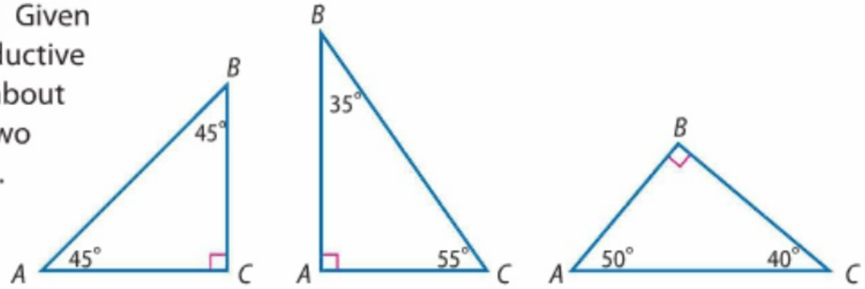
H.O.T. Problems Higher Order Thinking

5. CCSS **Reason Abstractly** Describe the theorem or definition you could use to find the measure of $\angle 2$.



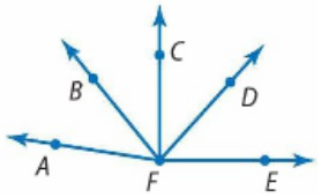
Sample answer: Vertical angles have the same measure.

6. CCSS **Persevere with Problems** Given the right triangles shown, use inductive reasoning to make a conjecture about the sum of the measures of the two acute angles of any right triangle.



Sample answer: The sum of the measures of the acute angles of a right triangle is 90°. So, the acute angles are complementary.

7. CCSS **Reason Inductively** In the diagram, $m\angle CFE = 90°$ and $m\angle AFB = m\angle CFD$. Which of the following conclusions does *not* have to be true? **II**



I $m\angle AFB + m\angle DFE = 90°$

II $\overline{BF}$ divides $\angle AFD$ in half

III $m\angle CFD = m\angle AFB$

IV $\angle CFE$ is a right angle.