

Lesson 2-5

Proving Angles Congruent

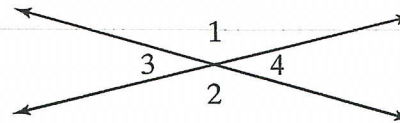
Lesson Objectives ▼ Prove and apply theorems about angles	California Content Standards GEOM 1.0, GEOM 2.0, GEOM 4.0
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Vocabulary and Key Concepts

Theorem 2-1: Vertical Angles Theorem

Vertical angles are .

$\angle 1 \cong \text{$ and $\angle 3 \cong \text{$



Theorem 2-2: Congruent Supplements Theorem

If two angles are supplements of the same angle (or of congruent angles), then the two angles are .

Theorem 2-3: Congruent Complements Theorem

If two angles are complements of the same angle (or of congruent angles), then the two angles are .

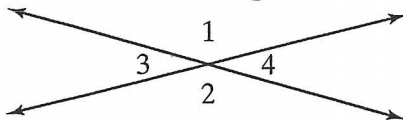
Theorem 2-4

All angles are congruent.

Theorem 2-5

If two angles are congruent and supplementary, then each is a angle.

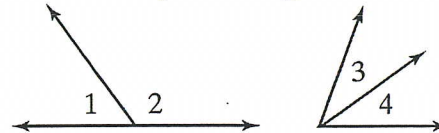
vertical angles



$\angle 1$ and are vertical angles,
as are $\angle 3$ and .

Vertical angles _____

adjacent angles



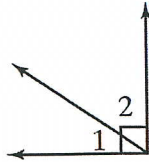
$\angle 1$ and are adjacent angles,
as are $\angle 3$ and .

Adjacent angles _____

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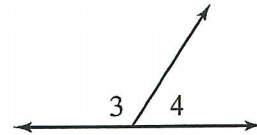
complementary angles



$\angle 1$ and are complementary angles.

Two angles are complementary angles if _____

supplementary angles



$\angle 3$ and are supplementary angles.

Two angles are supplementary angles if _____

A theorem _____

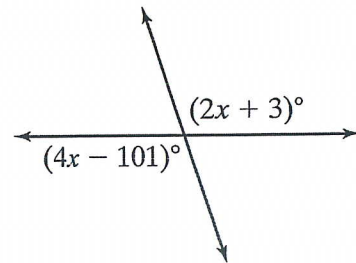
A _____ is a convincing argument that uses deductive reasoning in which statements and reasons are connected in sentences.

Examples

1 Using the Vertical Angles Theorem Find the value of x .

The angles with labeled measures are vertical angles. Apply the Vertical Angles Theorem to find x .

$4x - 101 = 2x + 3$	<input type="text"/>
$4x = 2x + 104$	<input type="text"/>
$2x = 104$	<input type="text"/>
$x = 52$	<input type="text"/>

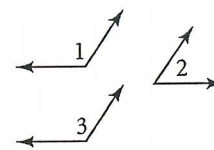


2 Proving Theorem 2-2 Write a paragraph proof of Theorem 2-2 using the diagram at the right.

Start with the given: $\angle 1$ and $\angle 2$ are supplementary, $\angle 3$ and $\angle 2$ are supplementary. By the definition of ,

$m\angle 1 + m\angle 2 = 180$ and $m\angle 3 + m\angle 2 = 180$. By substitution,

$m\angle 1 + m\angle 2 =$ $+$. Using the , subtract from each side. You get $m\angle 1 =$, or \cong .



Quick Check

1. Refer to the diagram for Example 1.

a. Find the measures of the labeled pair of vertical angles.

b. Find the measures of the other pair of vertical angles.

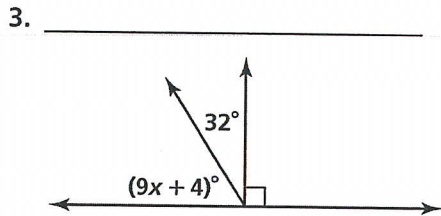
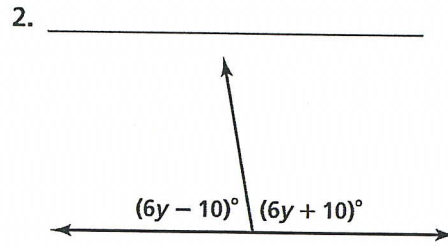
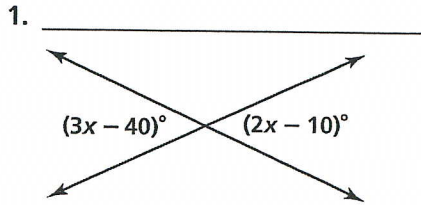
c. Check to see that adjacent angles are supplementary.

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Practice 2-5

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Find the values of the variables.



Find the measure of each angle.

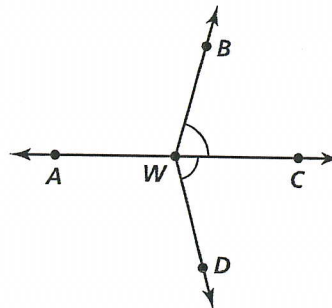
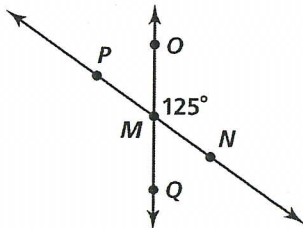
4. $\angle A$ is three times as large as its supplement, $\angle B$. _____

5. $\angle A$ is one eighth as large as its complement, $\angle B$. _____

Write three conclusions that can be drawn from each figure.

6. _____

7. _____



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