Name _____ Date _____ Period 4

Writing Proofs // Theorems about Angle Relationships

Lesson Objective IWBAT prove theorems about angle relationships.

General Rules for Proving Theorems…

1. Most theorems are stated in conditional form (i.e. "if-then")
2. To prove a theorem, use the "If…" as the given information, and the "then" as what you want to prove.

Right Angles Congruence Theorem: All right angles are congruent. (all rt. ∠'s are ≅)

➔ PROOF: See HW #2-8, problem #3!

Congruent Supplements Theorem: If two angles are supplementary to the same angle, (or two congruent angles), then those angles are congruent. (≅ supps. thm)

➔ PROOF: See HW #2-8, problem #4!

Congruent Complements Theorem: If two angles are complementary to the same angle, (or two congruent angles), then those angles are congruent. (≅ comps. thm)

➔ PROOF: Use the above proof from HW #2-8 to help you write a flow chart for this theorem.

Given: ∠A comp ∠B and ∠C comp ∠B

Prove: ∠A ≅ ∠C

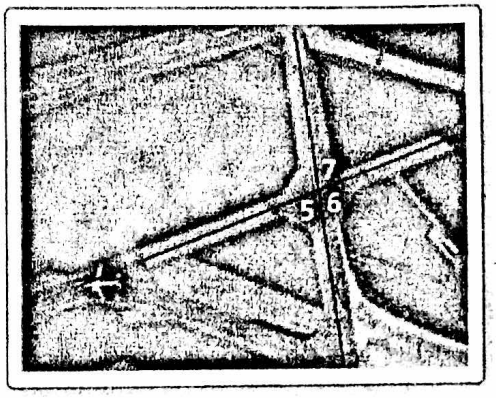
S	R
① ∠A comp ∠B, ∠C comp ∠B	① given
② $m\angle A + m\angle B = 90°$, $m\angle C + m\angle B = 90°$	② comp → add to 90°
③ $m\angle A + m\angle B = m\angle C + m\angle B$	③ trans. prop. =
④ $m\angle A = m\angle C$	④ subtr. prop. =
⑤ ∠A ≅ ∠C	⑤ = → ≅

Linear Pair Postulate: If two angles form a linear pair, then they are supplementary. (linear pair → supp.)

➔ Remember, postulates are accepted without needing a proof!

Vertical Angles Congruence Theorem: Vertical angles are congruent. (vert. ∠s are ≅)

→ PROOF: **Given:** ∠5 and ∠7 are vertical angles
Prove: ∠5 ≅ ∠7
***HINT: Use the linear pair postulate, and another theorem from the front side ☺*

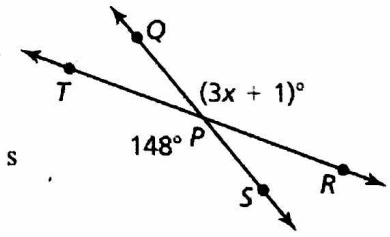


S	R
⓪ ∠5, ∠7 vert. ∠s	⓪ given
① ∠5, ∠6 linear pair ∠7, ∠6 linear pair	① def. of linear pair
② ∠5 supp ∠6 ∠7 supp ∠6	② Linear pair → supp
③ ∠5 ≅ ∠7	③ ≅ supps. thm

Using Angle Relationships

Example:

1. Find the value of x. ~~Start your work with a letter equation.~~

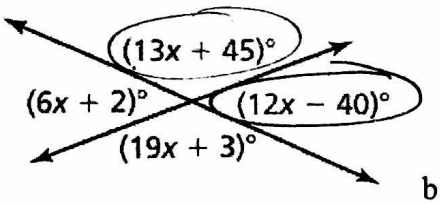


$148 = 3x + 1$

$147 = 3x$

$\boxed{x = 49}$

2. Describe and correct the error in using the diagram to find the value of x.



a. ✗

$(13x + 45)° + (19x + 3)° = 180°$
$32x + 48 = 180$
$32x = 132$
$x = 4.125$

$13x + 45 = 19x + 3$
$42 = 6x$
$7 = x$

b. ✗

$(13x + 45)° + (12x - 40)° = 90°$
$25x + 5 = 90$
$25x = 85$
$x = 3.4$

$25x + 5 = 180$
$25x = 175$
$x = 7$