

5.6 Warm-Up:

1. If a number is not odd, then it is even.

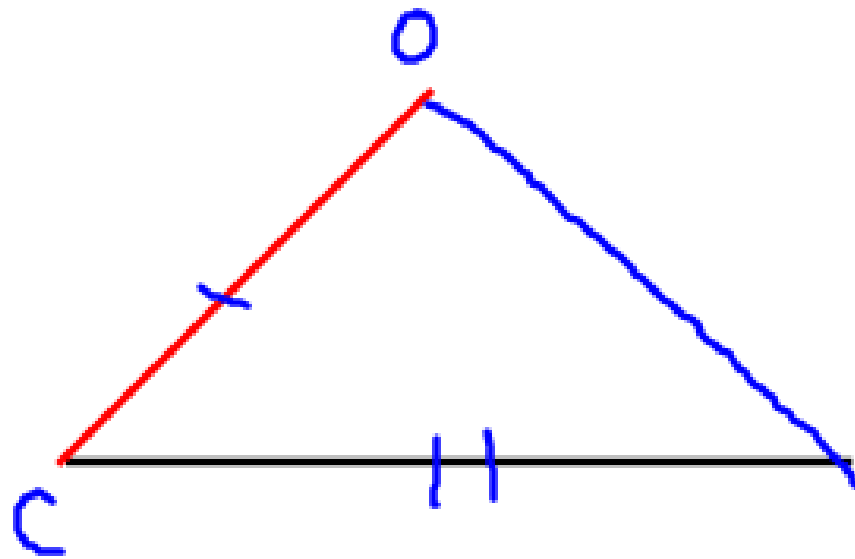
2. What is the opposite of "not a right angle"?

a right \angle

3. If A is not less than B, then...?

$B < A$ or $B = A$.

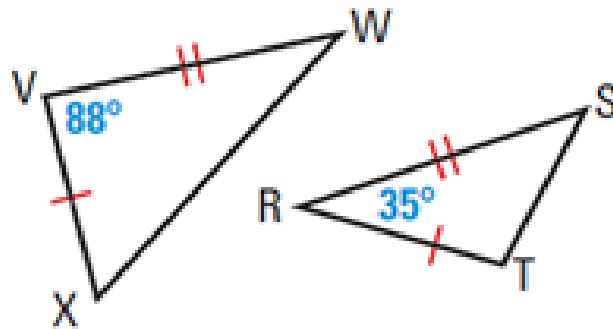
Examine the Hinge Theorem.



If $\overline{CO} \cong \overline{IG}$,
 $\overline{CW} \cong \overline{PI}$, &
 $m\angle I > m\angle C$,
then $PG > OW$

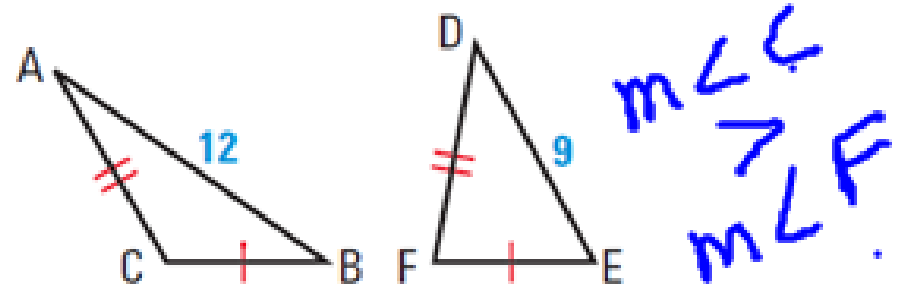


Hinge Theorem



If 2 sides of one triangle are congruent to two sides of another triangle, and the included angle of the first is larger than the included angle of the second, then the third side of the first is larger than the third side of the second.

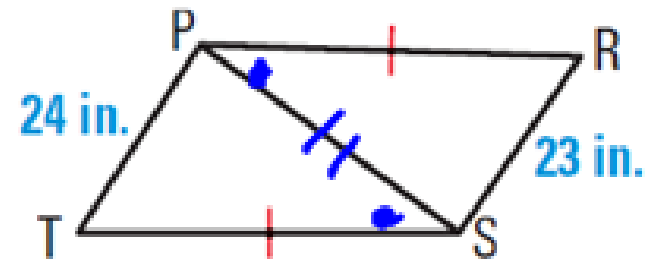
Converse of the Hinge Thm



If 2 sides of one triangle are congruent to two sides of another triangle, and ... the 3rd of one Δ is larger than the 3rd side of the other Δ , then the included \angle of the 1st Δ is larger than the included \angle of the 2nd Δ .

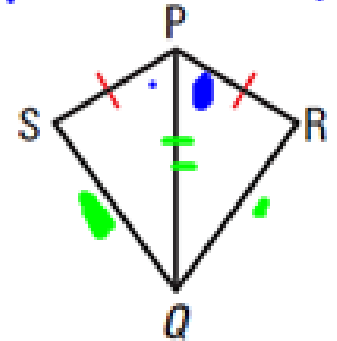
Given that $\overline{ST} \cong \overline{PR}$, how does $\angle PST$ compare to $\angle SPR$?

$m\angle PST > m\angle SPR$
by Converse.



Use the diagram at the right.

- If $PR = PS$ and $m\angle QPR > m\angle QPS$, which is longer, \overline{SQ} or \overline{RQ} ?
- If $PR = PS$ and $RQ < SQ$, which is larger, $\angle RPQ$ or $\angle SPQ$?

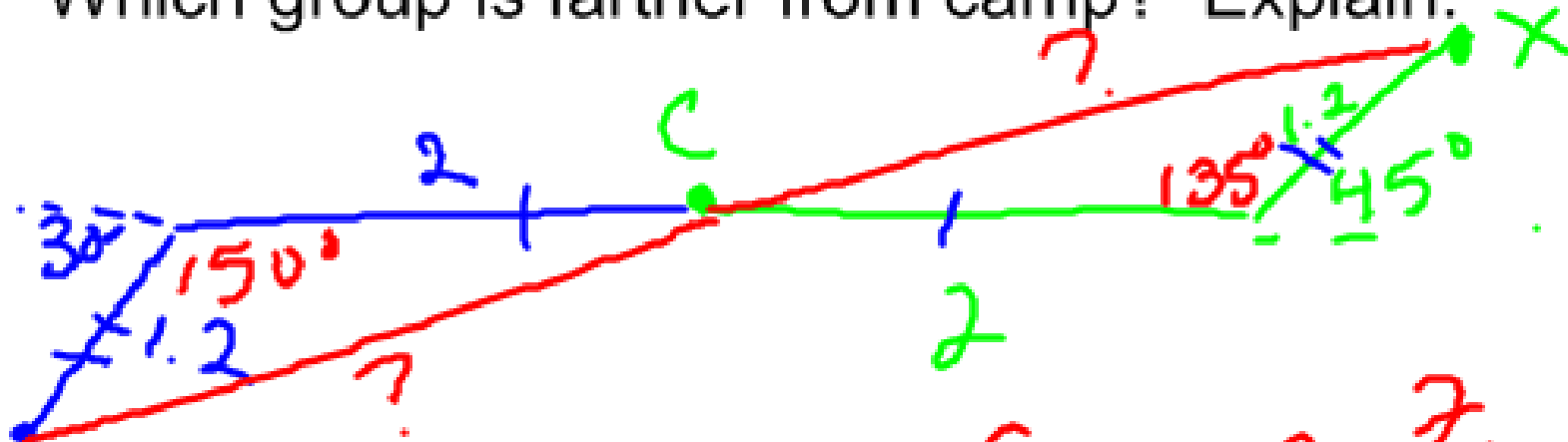


1. $RQ > SQ$ by Thm

2. $m\angle RPQ < m\angle SPQ$ by Converse.

Use the Hinge Thm

Two groups of bikers leave the same camp heading in opposite directions. Each group goes 2 miles, then changes direction and goes 1.2 miles. Group X starts due east and then turns 45 degrees toward north. Group Z starts due west and then turns 30 degrees toward south. Which group is farther from camp? Explain.



Group Z by
Hinge Thm.

***Introducing a New Proof... Indirect Proofs...
(crowd cheers, loud applause!!!)***

Example:

I assumed my parent would be home when I got home from school because they are usually home early on Thursdays and today is Thursday.

If they are home, their car is in the driveway, so I looked for the car, but the car was not there.

So, my assumption that they would be home must be false.

Indirect proof -

look for "then"

Step 1: What are we trying to prove? Assume temporarily that this statement is false by assuming the opposite is true.

Step 2: Reason logically until we reach a contradiction.

Find opposite of the given.

Step 3: What we were trying to prove must be false because what we find contradicts the given and proves the temporary assumption is false.

Use an indirect proof when \oslash options.

Suppose you wanted to prove the statement "If $x + y \neq 14$ and $y = 5$, then $x \neq 9$." What temporary assumption could you make to prove the conclusion indirectly? How does that assumption lead to a contradiction?

Assume $x = 9$. We know $x + y \neq 14$ and $y = 5$. When we substitute $x + y$ $x + y = 9 + 5 = 14$, but $x + y \neq 14$ which is a contradiction. So $x = 9$ must be false. $\therefore x \neq 9$.

Write an indirect proof.

Given: x is an odd number

Prove: x is not divisible by 4

Assume x is \div by 4. So

$\frac{x}{4} = n$ (n is an integer). Then

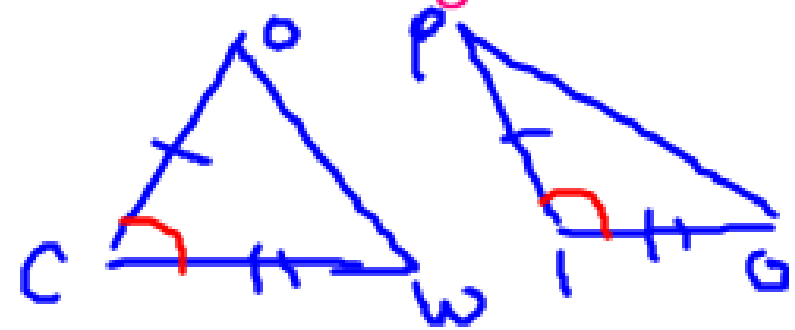
$$2 \cdot \frac{x}{4} = n \cdot 2, \quad \frac{x}{2} = 2n \quad (2n \text{ is an integer})$$

Which means x is \div by 2 & x is even. But this is a contradiction since x is odd (given). So x is not \div by 4.

Write an indirect proof for the Converse of the Hinge Thm

Given: $PG > OW$

Prove: $m\angle C < m\angle I$



Case 1: Assume $m\angle C > m\angle I$. Then

$OW > PG$ by Hinge Thm. But this contradicts given info.

Case 2: Assume $m\angle C = m\angle I$. Then

$OW = PG$ by SAS. $\rightarrow \leftarrow$

$\therefore m\angle C < m\angle I$

Homework:

pp 338 - 340

#'s 1-14, 22, 24

OR #'s 9, 10, 12, 14, 22, 24 (must be neat and miss no more than 1)

Next time we will review, test over Ch 5 following.