

Name:

Date:

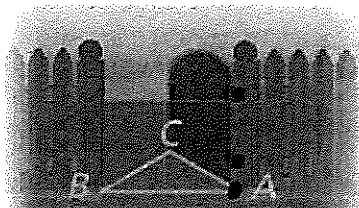
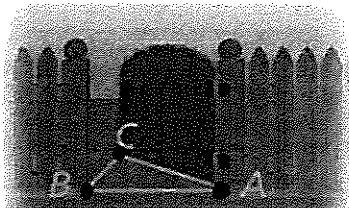
Period: 2

Hinge Theorem

Lesson Objective | WBAT use the Hinge Thm and its converse to compare lengths of sides and angle measures in 2 Δ s.

Imagine a gate between the fence posts A and B that has hinges at A and swings open at B.

As the gate swings open, you can think of ΔABC , with side $\overline{AC}$ formed by the gate itself, side $\overline{AB}$ representing the distance between the fence posts, and side $\overline{BC}$ representing the opening between post B and the outer edge of the gate.



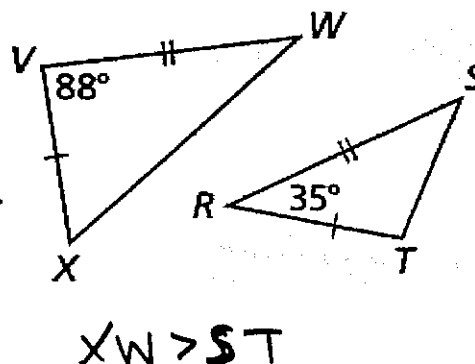
Notice that as the gate opens wider, both the measure of $\angle A$ and the distance BC increase. This suggests the Hinge Theorem

Hinge Theorem

If two sides of one Δ are congruent to two sides of another Δ , and the

included angle of the first Δ is larger than the included angle of the

second Δ , then the third side of the first Δ is larger than the third side of the second Δ .

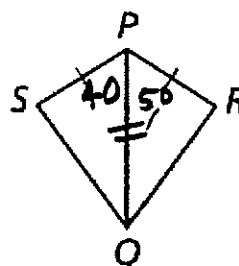


Example:

$$50 > 40$$

1. If $PR = PS$ and $\underline{m\angle QPR > m\angle QPS}$, which is longer: SQ or RQ?

$$RQ > SQ$$



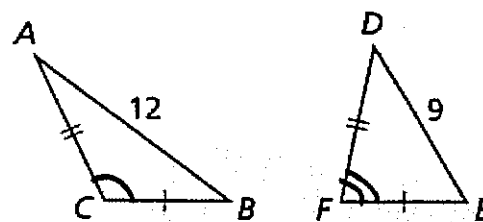
Converse of the Hinge Theorem

If two sides of one Δ are congruent to two sides of another Δ , and the

third side of the first Δ is longer than the third side of the second Δ , then

the included angle of the first Δ is larger than the

included angle of the second Δ .

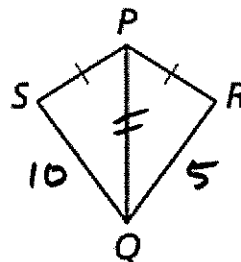


$$m\angle C > m\angle F$$

Example:

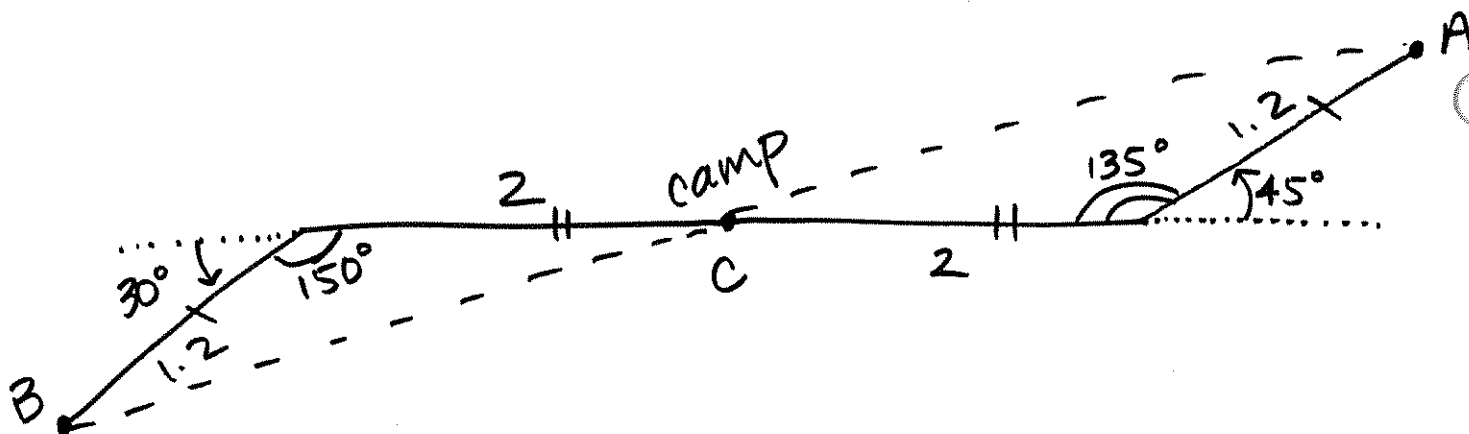
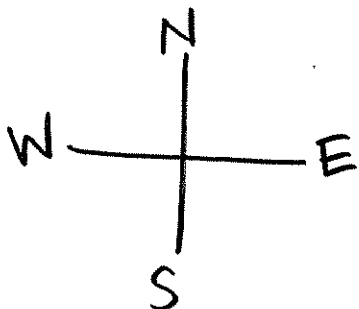
$$5 < 10$$

2. If $PR = PS$ and $RQ < SQ$, which is larger: $\angle RPQ$ or $\angle SPQ$?



$$m\angle SPQ > m\angle RPQ$$

3. Two groups of bikers leave the same camp heading in opposite directions. Each group travels 2 miles, then changes direction and travels 1.2 miles. Group A Starts due east and then turns 45° toward north. Group B starts due west and then turns 30° toward south. Which group is farther from camp, A or B? Draw a diagram and explain.



$BC > AC$ because $150^\circ > 135^\circ$.