

# Chapter 6

## Relationships Within Triangles

6.1 Perpendicular and Angle Bisectors

6.2 Bisectors of Triangles

6.3 Medians and Altitudes of Triangles

6.4 The Triangle Midsegment Theorem

6.5 Indirect Proof and Inequalities in One Triangle

**6.6 Inequalities in Two Triangles**



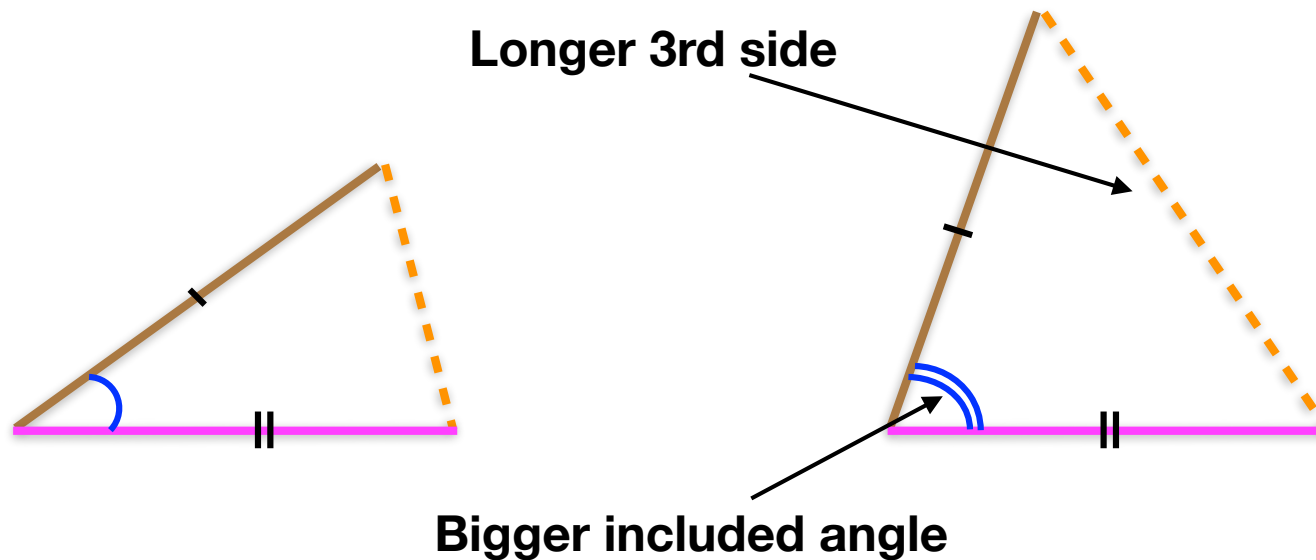
## 6.6 Inequalities in Two Triangles

- Doors pivot on their hinge.
- As the door opens wider, the door length and the opening in the floor do not change.
- BUT the opening gets bigger.



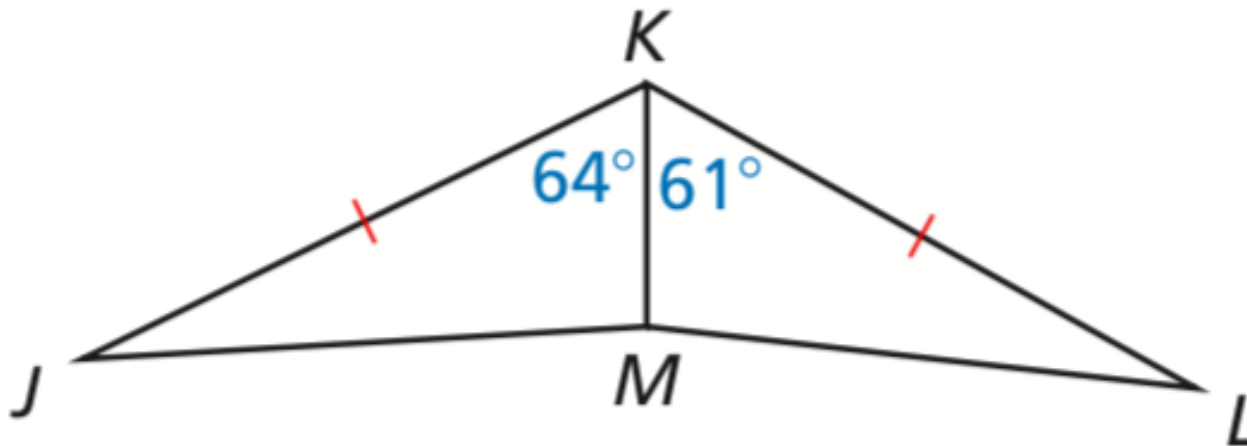
## 6.6 Inequalities in Two Triangles

- This is called a “hinge effect.”
- Two sides of a triangle stay the same length, but the third side changes.
- If the included angle (between) gets bigger, then the third side gets longer.



## 6.6 Inequalities in Two Triangles

- **Example:** Which is greater? Side JM or ML?



# 6.6 Inequalities in Two Triangles

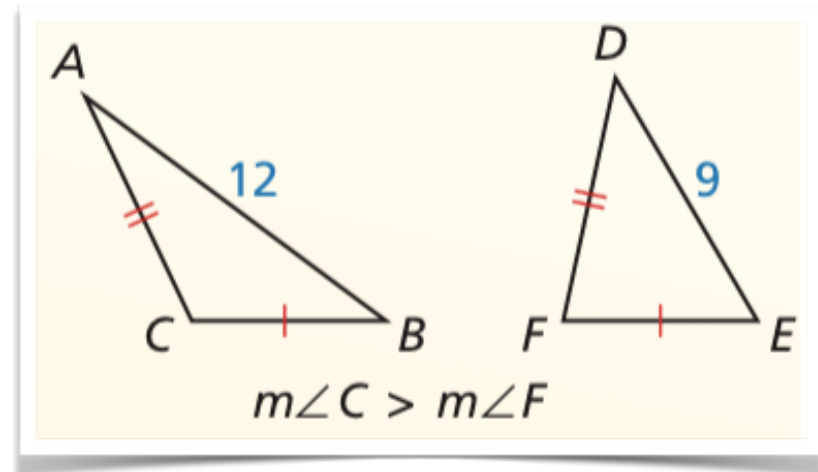
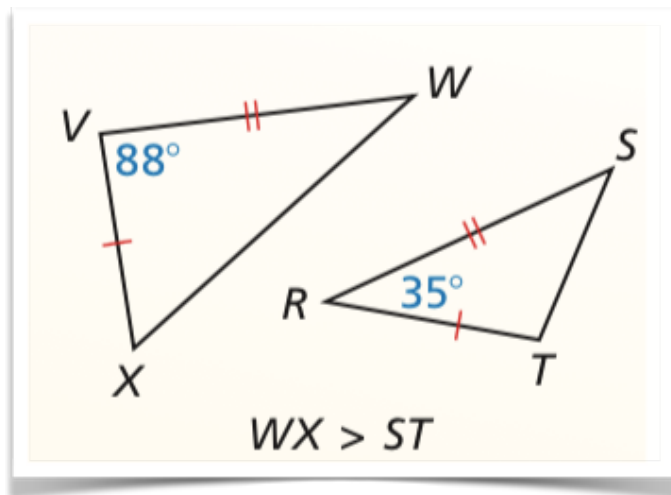
## Theorems

### Hinge Theorem

If two 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 longer than the third side of the second.

### Converse of the Hinge Theorem

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



## 6.6 Inequalities in Two Triangles

**Problem:** 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  $45^\circ$  toward north. Group B starts due west and then turns  $30^\circ$  toward south. Which group is farther from camp? Explain your reasoning.

