

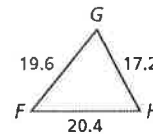
6.5 - 6.6 Applying Inequalities in Triangles

Angle-Side Relationships in Triangles:

In a triangle, the longest side is across from the largest angle and the smallest side is across from the smallest angle.

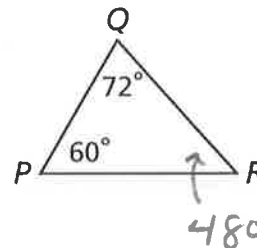
Write the angles in order from smallest to largest.

$\angle F, \angle H, \angle G$



Write the sides in order from shortest to longest.

$\overline{PQ}, \overline{QR}, \overline{PR}$



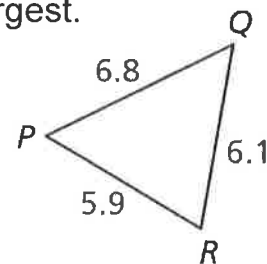
$$180 - (72 + 60)$$

$$180 - 132$$

$$48^\circ$$

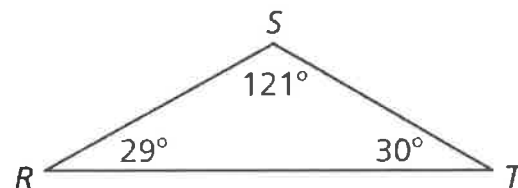
List the angles of $\triangle PQR$ in order from smallest to largest.

$\angle Q, \angle P, \angle R$

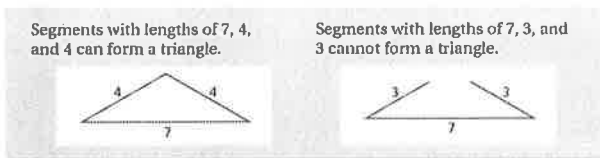


List the sides of $\triangle RST$ in order from shortest to longest.

$\overline{ST}, \overline{RS}, \overline{RT}$



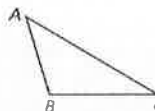
A triangle is formed by three segments, but not every set of three segments can form a triangle.



Triangle Inequality Theorem:

The sum of any two side lengths of a triangle is greater than the third side length.

$$\begin{aligned} AB + BC &> AC \\ BC + AC &> AB \\ AC + AB &> BC \end{aligned}$$



* Sum of smaller two angles must be > largest *

Tell whether a triangle can have sides with the given lengths. Explain.

7, 10, 19 ?
 $7 + 10 > 19$
 Not a Δ

8, 13, 21 ?
 $8 + 13 > 21$
 Not a Δ

2.3, 3.1, 4.6 ?
 $2.3 + 3.1 > 4.6$
 Yes

6.2, 7, 9 ?
 $6.2 + 7 > 9$
 Yes

A triangle has one side of length 14 and another side of length 9. Describe the possible lengths of the third side.

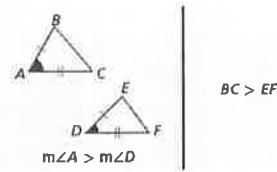
<p>X - other side</p>	<p><u>If x was smaller than 14</u></p> $\begin{aligned} 9 + x &> 14 \\ -9 & \quad -9 \\ \hline x &> 5 \end{aligned}$	<p><u>If x was bigger than 14</u></p> $\begin{aligned} 9 + 14 &> x \\ \hline 23 &> x \end{aligned}$
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> $5 < x < 23$ </div>	

A triangle has one side length 12 inches and another side length of 20 inches. Describe the possible lengths of the third side.

$\begin{aligned} x + 12 &> 20 \\ -12 & \quad -12 \\ \hline x &> 8 \end{aligned}$	$\begin{aligned} 12 + 20 &> x \\ \hline 32 &> x \end{aligned}$
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> $8 < x < 32$ </div>	

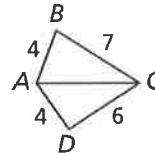
Hinge Theorem:

If two different triangles have two sets of congruent sides, then the longer third side is across from the largest included angle. (Larger angle is across from longer side in similar cases)



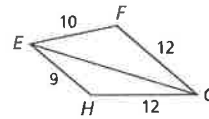
Compare $m\angle BAC$ and $m\angle DAC$.

$\angle BAC > \angle DAC$



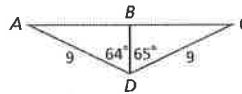
Compare $m\angle EGH$ and $m\angle EGF$.

$\angle EGH < \angle EGF$

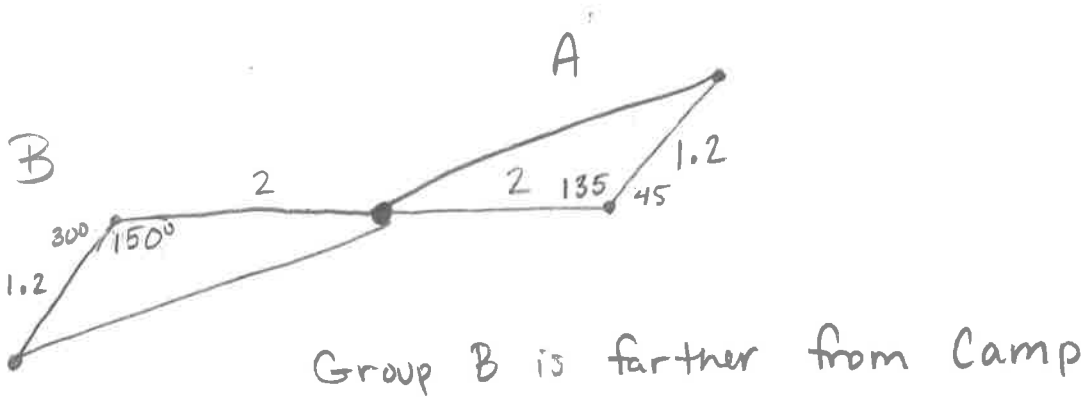


Compare BC and AB .

$\overline{BC} > \overline{AB}$



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? Explain your reasoning.



Homework:

pg. 340 #7, 8, 11-18, 21-24, 26, 29, 30

and

pg. 347 #4-10 Evens, 16, 20