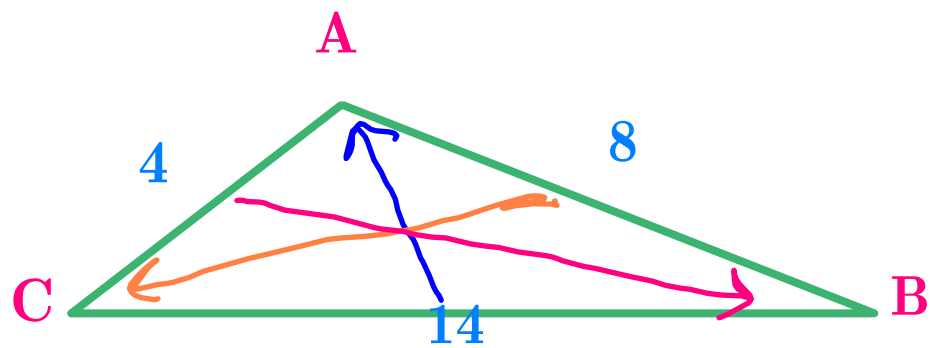
4.7 Triangle Inequalities

If one side of a triangle is longer than another side, then the angle opposite the longer side is larger than the angle opposite the shorter side.

Example: Name the angles in order from largest to smallest.

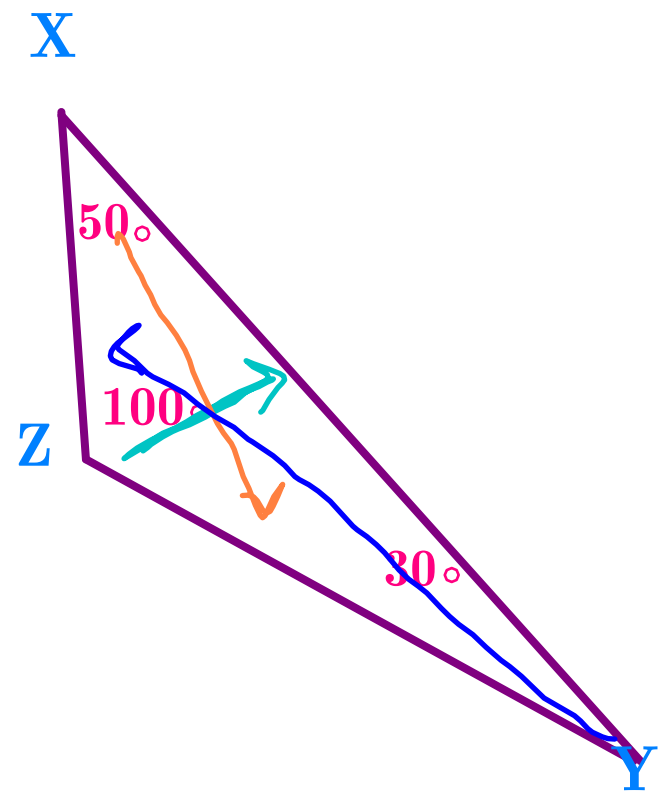
$\angle A \quad \angle C \quad \angle B$



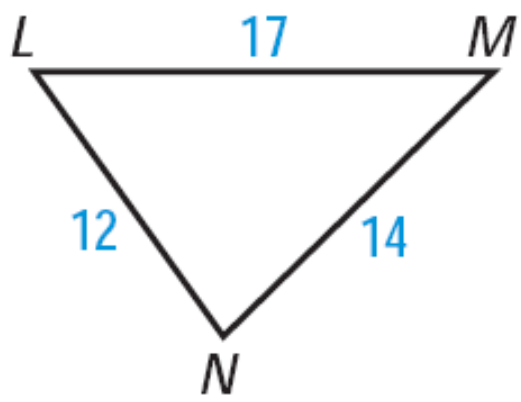
If one angle of a triangle is larger than another angle, then the side opposite the larger angle is longer than the side opposite the smaller angle.

Example: Name the sides from longest to shortest.

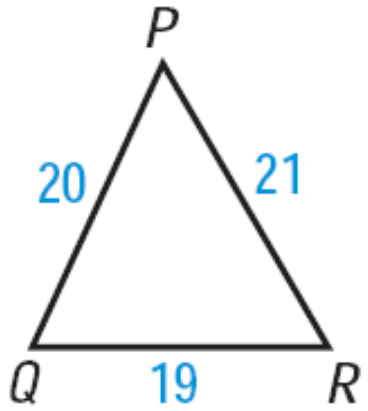
$\overline{XY}$ $\overline{ZY}$ $\overline{XZ}$



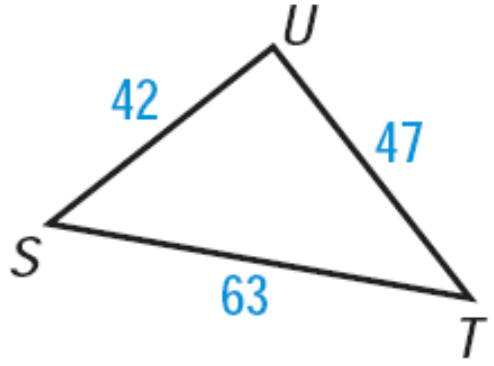
Name the angles from largest to smallest.

1. 

∠N, ∠L, ∠M

2. 

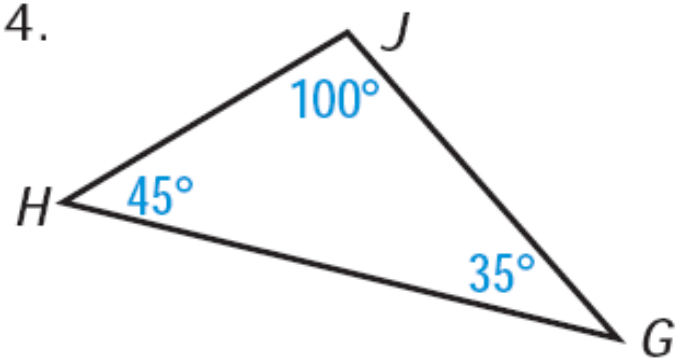
∠Q, ∠R, ∠P

3. 

∠U, ∠S, ∠T

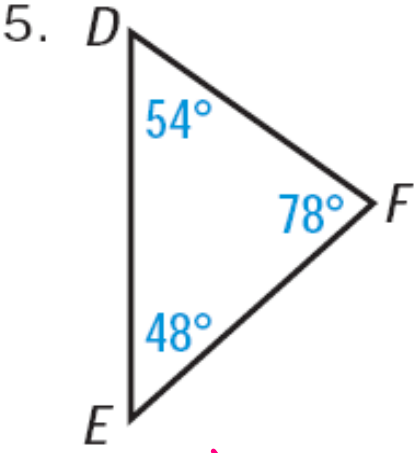
Name the sides from longest to shortest.

4.



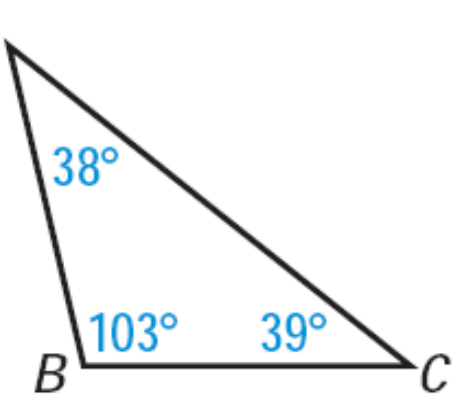
$\overline{HG}$, $\overline{JG}$, $\overline{HJ}$

5.



$\overline{DE}$, $\overline{FE}$, $\overline{FD}$

6.



$\overline{AC}$, $\overline{BA}$, $\overline{BC}$

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

Can the side lengths form a triangle? Explain.

7, 10, 15

$7+10>15$ ✓

$10+15>7$ ✓

$15+7>10$ ✓

yes △

9, 11, 20

$9+11 \not> 20$

no, not a △

12, 15, 30

$12+15 \not> 30$

no, not a △

Can the side lengths form a triangle? Explain.

7) 5, 7, 13

$5+7 \not> 13$

not a $\triangle$

8) 6, 9, 12

$6+9>12$ ✓

$9+12>6$ ✓

$12+6>9$ ✓

yes

9) 10, 15, 25

$10+15 \not> 25$

not a $\triangle$