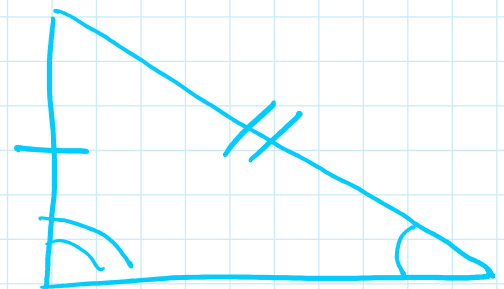
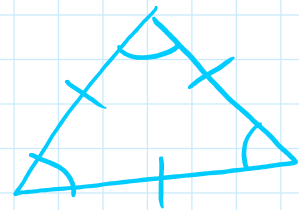


What You Will Learn

- ▶ List sides and angles of a triangle in order by size.
- ▶ Use the Triangle Inequality Theorem to find possible side lengths of triangles.

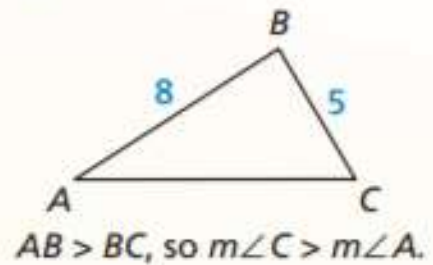
Draw an ~~obtuse~~ scalene triangle. Find the largest angle and the longest side and mark them in red. Find the smallest angle and shortest side and mark them in blue. What do you notice?



Theorem 6.9 Triangle Longer Side Theorem

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.

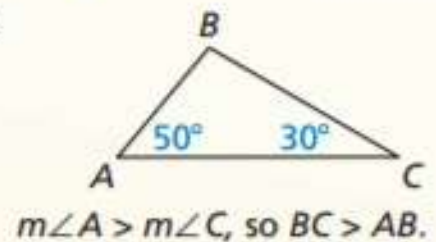
Proof Ex. 43, p. 342



Theorem 6.10 Triangle Larger Angle Theorem

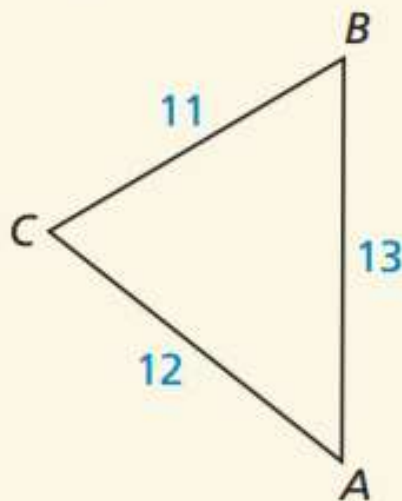
If one angle of a triangle is larger than another angle, then the side opposite the larger angle is longer than the side opposite the smaller angle.

Proof p. 337



opposite elements are related to each other - largest is opposite largest smallest is opp. smallest.

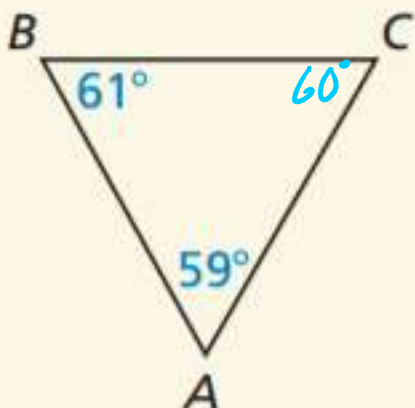
List the angles of $\triangle ABC$ in order from smallest to largest.



~~CB~~
~~CA~~
~~AB~~

$\angle A$ smallest
 $\angle B$ Goldilocks
 $\angle C$ largest

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



$$180 = x + 61 + 59$$

$$180 = x + 120$$

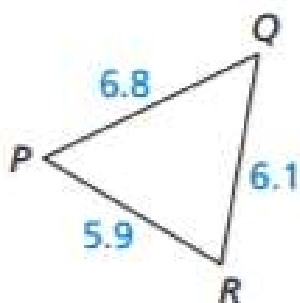
$$60 = x$$

\overline{BC} smallest

\overline{BA} Goldilocks

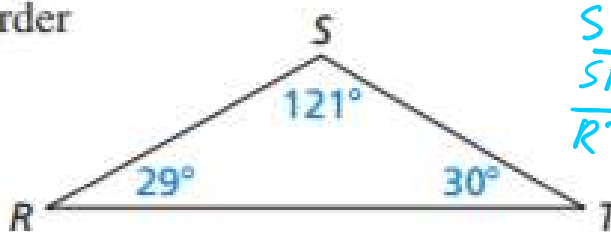
\overline{AC} largest

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



$\angle Q$ smallest
 $\angle P$
 $\angle R$ largest

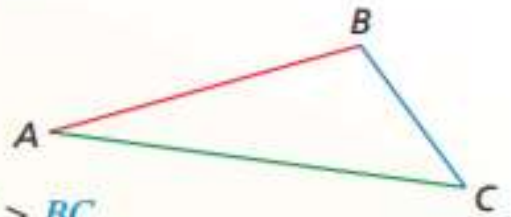
3. List the sides of $\triangle RST$ in order from shortest to longest.



\overline{ST} smallest
 \overline{SR}
 \overline{RT} largest

Theorem 6.11 Triangle Inequality Theorem

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



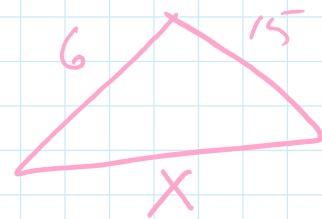
$$AB + BC > AC \quad AC + BC > AB \quad AB + AC > BC$$

add any 2 sides of a Δ and their sum $>$ the remaining side.

$$12 \quad 1 \quad 2 \quad 17 \quad 2.5 \quad 5\frac{1}{2}$$

$$10 \quad 2 \quad 1 \quad .5 \quad .5 \quad 4.9$$

A triangle has one side of length 6 and another side of length 15. Describe the possible lengths of the third side.



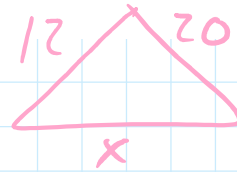
$$\begin{array}{r} 6 + X > 15 \\ -6 \quad -6 \\ \hline X > 9 \end{array}$$

$$\begin{array}{r} X + 15 > 6 \\ -15 \quad -15 \\ \hline X > -9 \end{array}$$

$$\begin{array}{r} 6 + 15 > X \\ \hline 21 > X \end{array}$$

$$9 < x < 21$$

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



~~$$12 + x > 20$$

$$-12 \quad -12$$~~

$$x > 8$$

$$20 + x > 12$$

$$-20 \quad -20$$

$$x > -8$$

$$12 + 20 > x$$

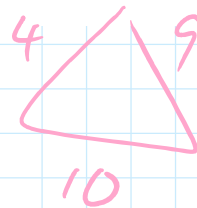
$$32 > x$$

$$8 < x < 32$$

~~$$32 > x > 8$$~~

Decide whether it is possible to construct a triangle with the given side lengths. Explain your reasoning.

5. 4 ft, 9 ft, 10 ft

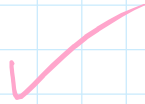


$$4 + 9 > 10$$

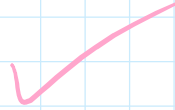
$$9 + 10 > 4$$

$$10 + 4 > 9$$

$$13 > 10$$



$$19 > 4$$



$$14 > 9$$

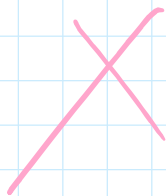


Decide whether it is possible to construct a triangle with the given side lengths. Explain your reasoning.

6. 8 m, 9 m, 18 m

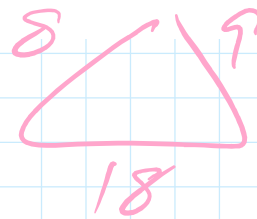
$$8 + 9 > 18$$

$$17 > 18$$



Not possible

No



Practice sec 6.5 pg.

340: 2, 11-23A

