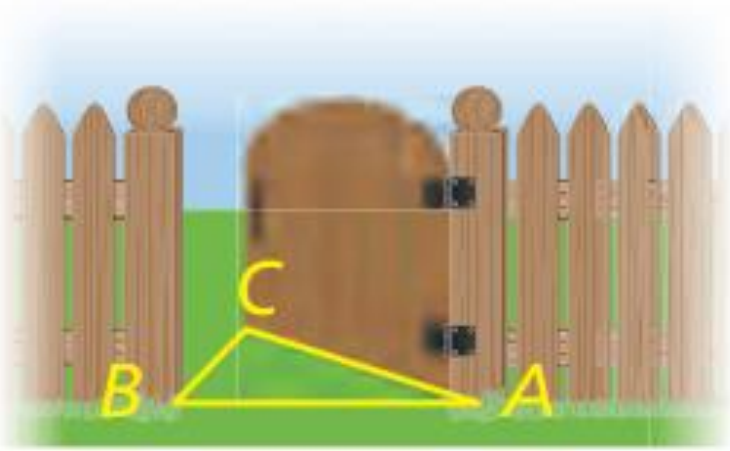
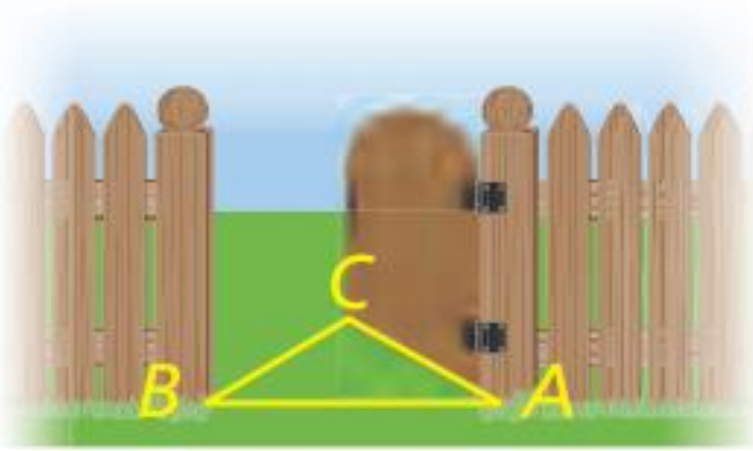
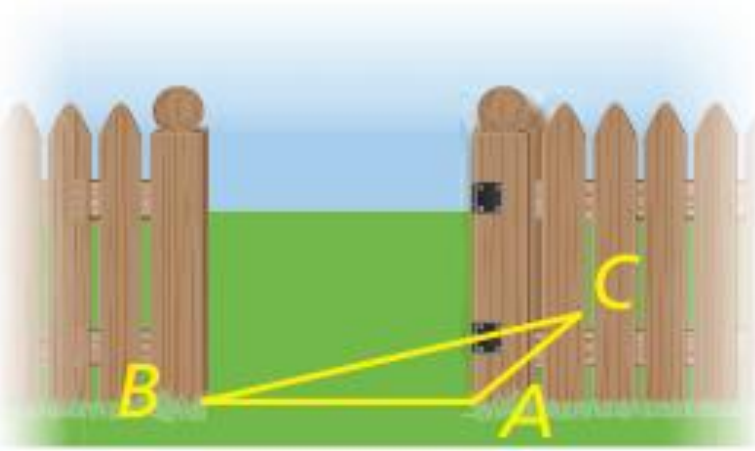
Inequalities and One and Two Triangles

Lessons 6.5 and 6.6







Observations

Classify the triangle.

Scalene
obtuse

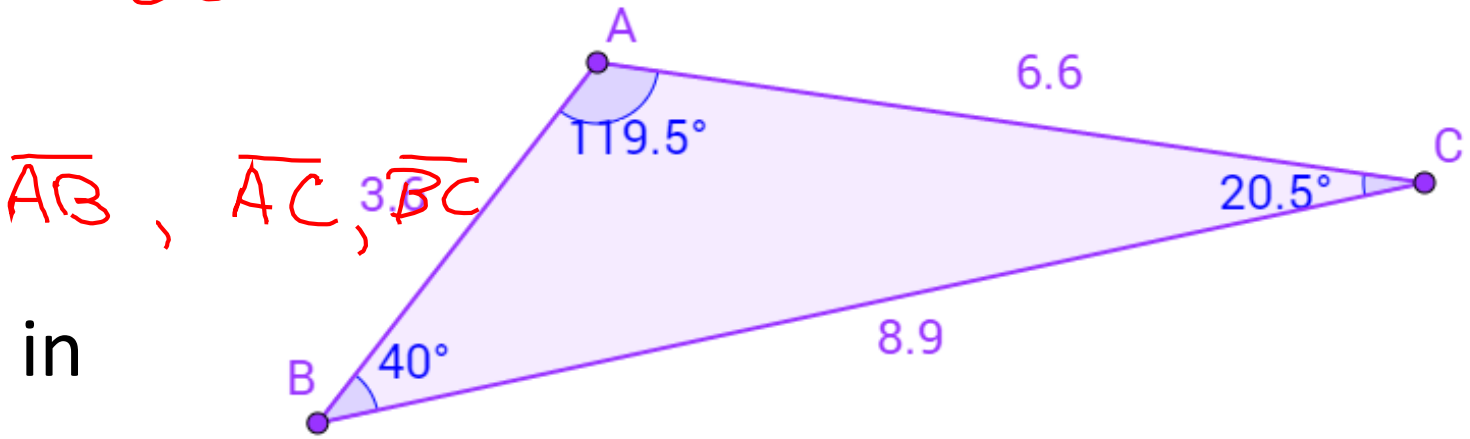
List the side lengths in order from smallest to largest.

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

List the angle measures in order from smallest to largest.

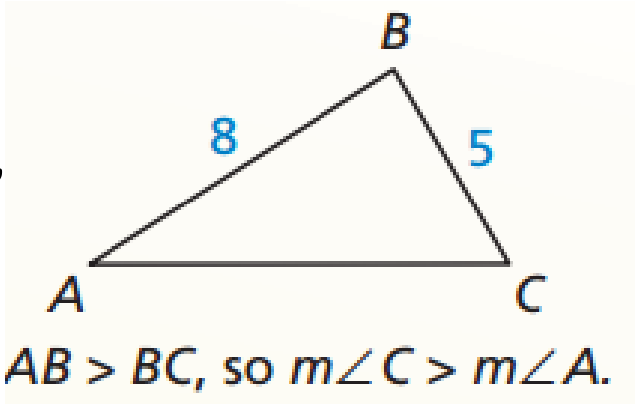
$\angle C$, $\angle B$, $\angle A$

What do you notice?



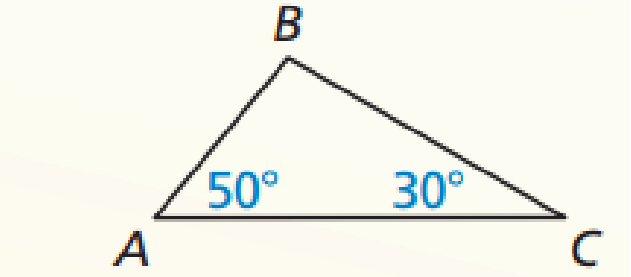
Triangle Longer Side and Larger Angle Theorems

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.



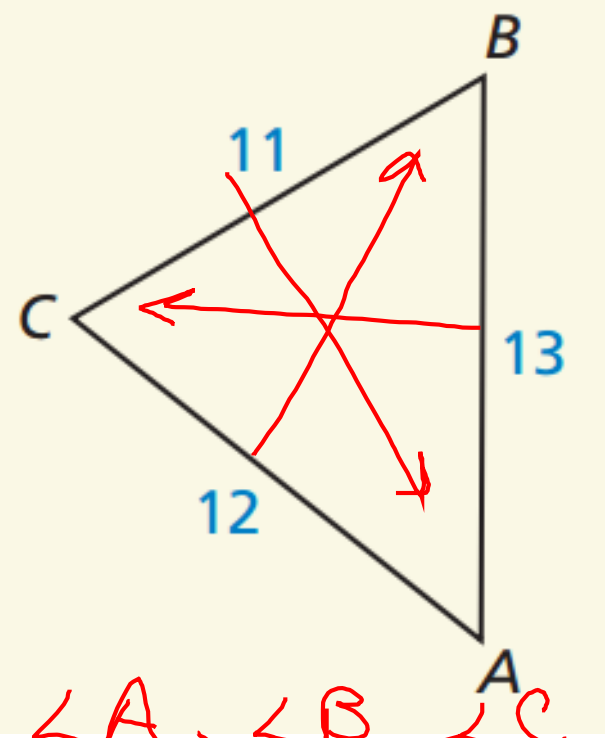
$AB > BC$, so $m\angle C > m\angle A$.

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.



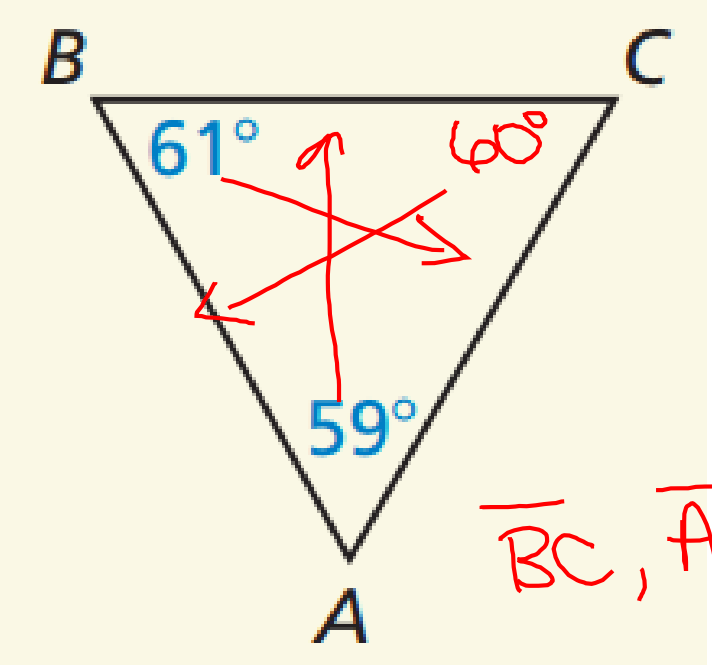
$m\angle A > m\angle C$, so $BC > AB$.

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



$\angle A, \angle B, \angle C$

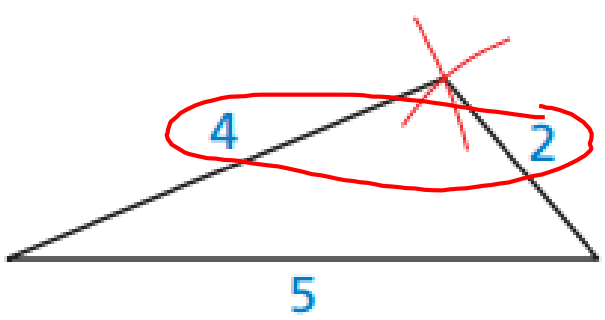
List the sides of $\triangle ABC$ in order from shortest to longest.

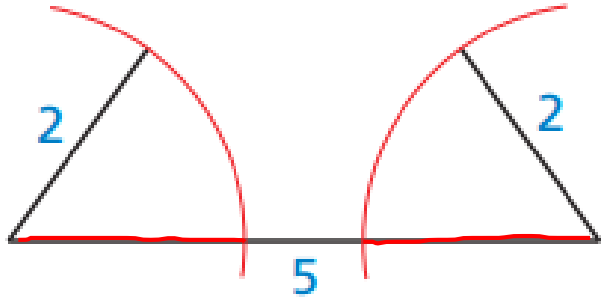


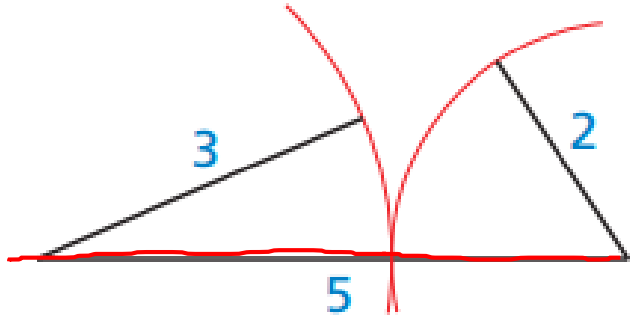
$\overline{BC}, \overline{AB}, \overline{CA}$

Triangle Inequality Theorem

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



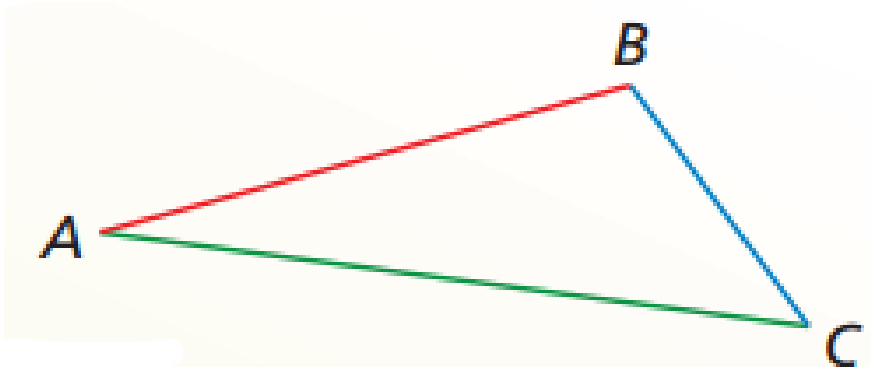




AB + BC > AC

AC + BC > AB

AB + AC > BC



Determine whether it is possible to construct a triangle with the given side lengths. Show your work.

$4ft, 9ft, 10ft$

$4+9 > 10$

yes

$13 > 10$

$8m, 9m, 18m$

$8+9 < 18$

no

$5cm, 7cm, 12cm$

$5+7 = 12$

no

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

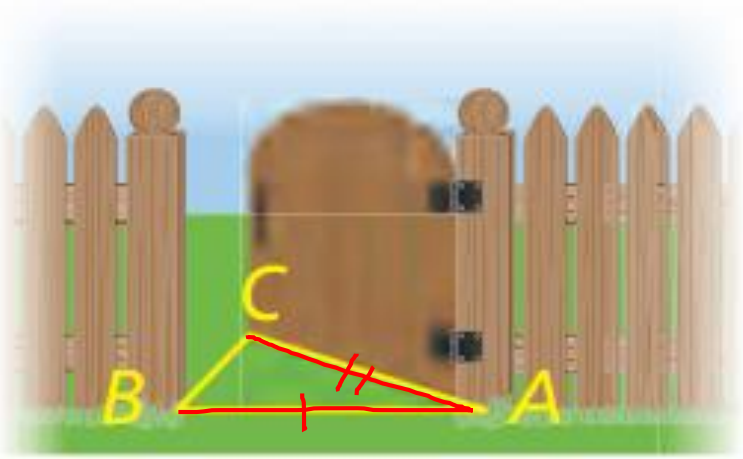
$$\begin{array}{r} 9 \\ +14 \\ \hline 23 \end{array} \qquad \begin{array}{r} 14 \\ -\ 9 \\ \hline 5 \end{array}$$

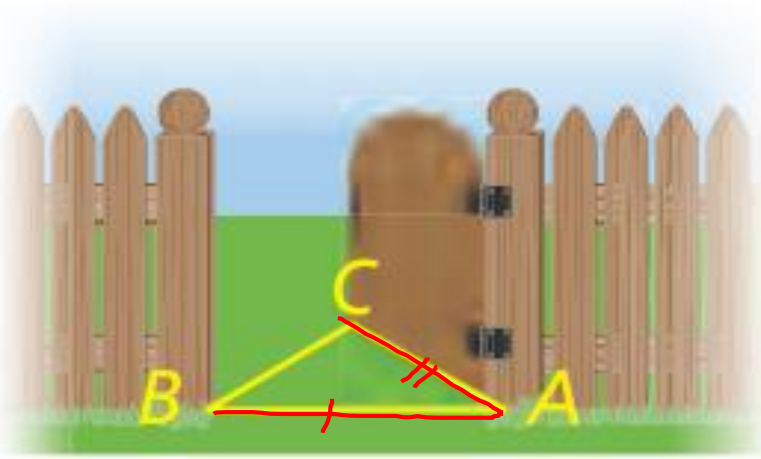
$5 < x < 23$

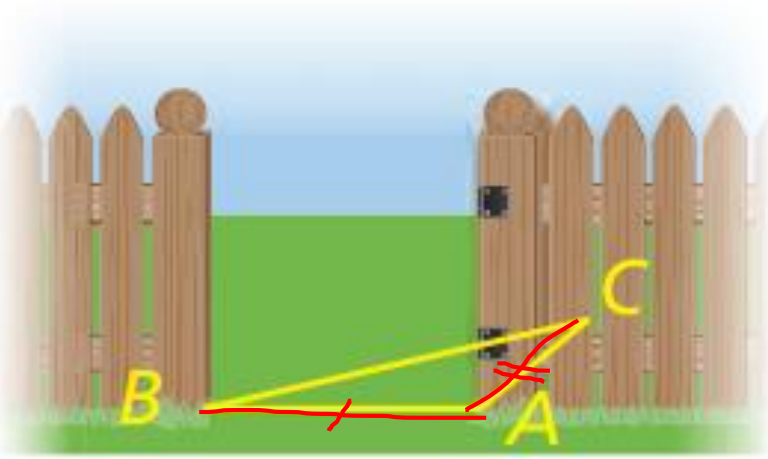
x bigger than 5

x smaller than 23

Hinge Theorem

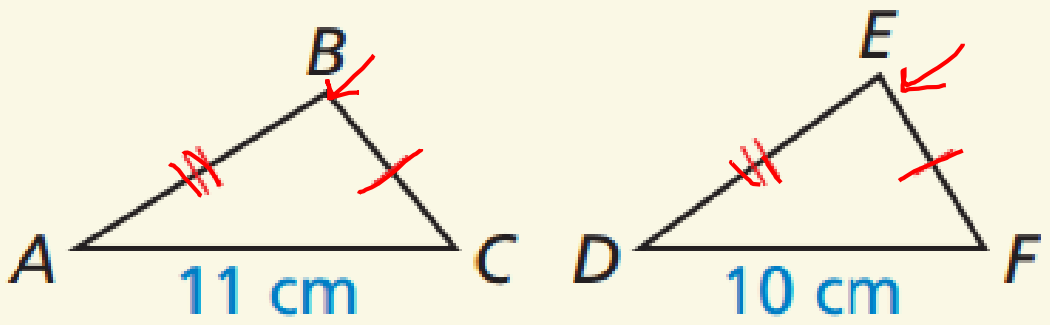






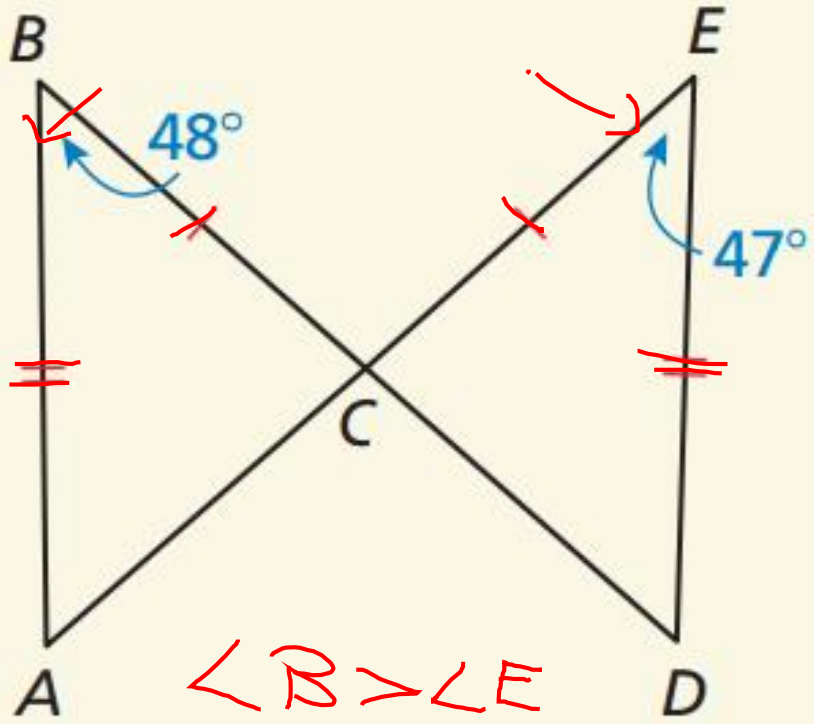
As the gate opens wider, both the measure of ∠A and the distance BC increase.

Given that $\overline{AB} \cong \overline{DE}$ and $\overline{BC} \cong \overline{EF}$, how does $m\angle B$ compare to $m\angle E$?



$\angle B > \angle E$

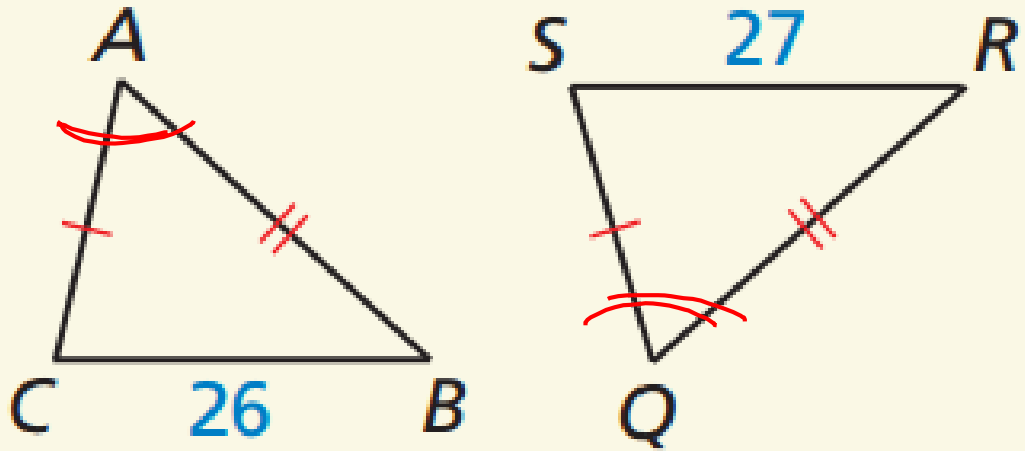
Given that $\overline{AB} \cong \overline{DE}$ and $\overline{BC} \cong \overline{EC}$, how does AC compare to DC?



$\angle B > \angle E$

$\angle E < \angle B$

What can you conclude about the measures of $\angle A$ and $\angle Q$ in this figure? Explain.



$2x+3 < 3x-7$

$-3x-3 \quad -3x-3$

$-x < -10$

$x > 10$

$2x+3 < 3x-7$

$-2x+7 \quad -2x+7$

$10 < x$

$x > 10$

$\angle Q > \angle A$

$\angle A < \angle Q$