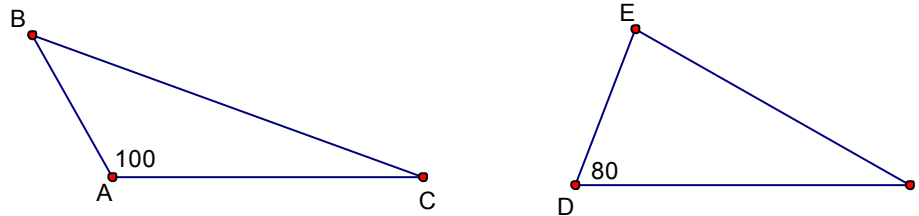


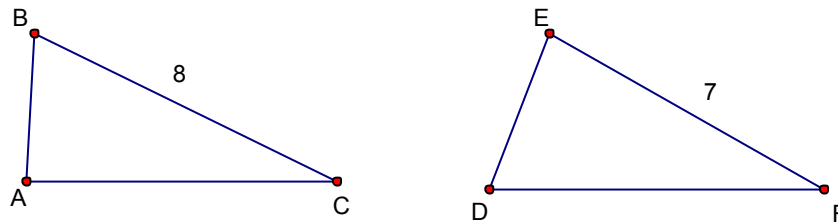
5-6 Hinge Theorem, Inequalities in two triangles

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 triangle is longer than the third side of the second triangle.



If $\overline{AB} \cong \overline{DE}$ and $\overline{AC} \cong \overline{DF}$, and $m\angle BAC = 100^\circ$ and $m\angle EDF = 80^\circ$, then $\overline{BC} > \overline{EF}$.

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 triangle is longer than the third side of the second triangle, then the included angle of the first is larger than the included angle of the second.



If $\overline{AB} \cong \overline{DE}$ and $\overline{AC} \cong \overline{DF}$ and $\overline{BC} = 8$ and $\overline{EF} = 7$, then $m\angle BAC > m\angle EDF$.

Example:

Use your protractor and a straight edge...

You and a friend are flying separate planes. You leave the airport and fly 120 miles due west. You then change directions and fly $W\ 30^\circ\ N$ for 70 miles. ($W\ 30^\circ\ N$ indicates a northwest direction that is 30° north of due west.) Your friend leaves the airport and flies 120 miles due east. She then changes direction and flies $E\ 50^\circ\ S$ for 70 miles. Each of you has flown 190 miles, but which plane is further from the airport? Draw a model of the flight path using a straight edge and your protractor. Label your flight path triangle $\triangle ABC$ and your friend's flight path triangle $\triangle AEF$.