NAME _____ DATE _____

Technology Activity

For use with pages 302–308

**GOAL** **To demonstrate the Hinge Theorem**

This activity begins by constructing an example of the Hinge Theorem and then takes a look at a specific problem.

Activity

❶ Construct two triangles with two sides of one triangle congruent to two sides of another triangle, making the included angles different measures.

❷ Measure the included angles.

❸ Measure the lengths of the third sides.

❹ Drag a vertex of one of the triangles and compare the measures of the included angles and the lengths of the third sides.

❺ Drag a vertex so that the measures of the included angles are congruent.
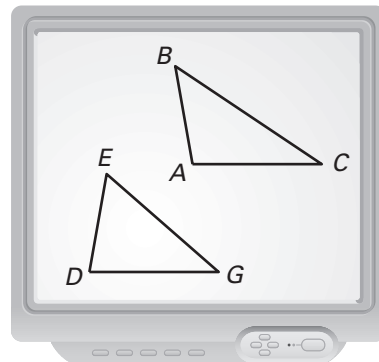
Exercises

1. When $m\angle BAC = m\angle EDG$, what can you conclude about BC and EG? What can you conclude about $\triangle ABC$ and $\triangle DEG$?

2. In the figure below, $\overline{AC} \cong \overline{DG}$, $\overline{AB} \cong \overline{DF}$, $BC = 5.0$ centimeters, $m\angle BAC = 56°$, and $m\angle GDF = 90°$. Construct the figure using geometry software. What is a possible length for $\overline{FG}$?
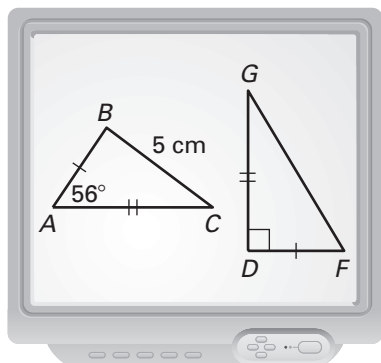
Technology Activity Keystrokes

For use with pages 302–308

TI-92

1. Construct two triangles with two sides of one triangle congruent to two sides of another triangle and making the included angles of different measures.

   Construct scalene triangle *ABC* using the segment command. $\left(\boxed{\text{F2}}\ 5\right)$

   To construct the second triangle, construct a ray $\left(\boxed{\text{F2}}\ 6\right)$ and label the endpoint *D*.

   Use compass $\left(\boxed{\text{F4}}\ 8\right)$ to copy segment *AB*. $\big[$(Place cursor on point *D*.) $\boxed{\text{ENTER}}$

   (Move cursor to segment *AB*.) $\boxed{\text{ENTER}}\big]$

   Construct point *E* as the intersection between the circle and the ray. $\left(\boxed{\text{F2}}\ 3\right)$

   Construct segment *DE*. $\left(\boxed{\text{F2}}\ 5\right)$

   Use compass $\left(\boxed{\text{F4}}\ 8\right)$ to copy segment *AC*.

   Construct segment *DF*. $\left(\boxed{\text{F2}}\ 5\right)\big[$(Place cursor on point *D*.) $\boxed{\text{ENTER}}$

   (Move cursor to any point on the circle.) $\boxed{\text{ENTER}}\ \text{F}\big]$

   Construct segment *EF*. $\left(\boxed{\text{F2}}\ 5\right)$

   Hide the two circles and the ray. $\left(\boxed{\text{F7}}\ 1\right)$

2. Measure angles *A* and *D*.

   $\boxed{\text{F6}}$ 3 (Place cursor on point *C*.) $\boxed{\text{ENTER}}$ (Move cursor to Point *A*.) $\boxed{\text{ENTER}}$
   (Move cursor to point B.) $\boxed{\text{ENTER}}$ A $\boxed{=}$ Repeat for angle *D*.

3. Measure the lengths of sides *BC* and *EF*. $\left(\boxed{\text{F6}}\ 1\right)$

4. Drag a vertex of one of the triangles and compare the measures of angles *A* and *D* and also the lengths of sides *BC* and *EF*.

   $\boxed{\text{F1}}$ 1 (Place cursor on point.) $\boxed{\text{ENTER}}$ (Use the drag key and the cursor pad to drag the point.)

5. Drag a vertex so that the measures of the included angles are congruent.

   $\boxed{\text{F1}}$ 1 (Place cursor on point.) $\boxed{\text{ENTER}}$ (Use the drag key and the cursor pad to drag the point.)

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Technology Activity Keystrokes

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SKETCHPAD

1. Construct two triangles with two sides of one triangle congruent to two sides of another triangle and making the included angles of different measure.

   Construct triangle *ABC* by selecting segment from the straightedge tools. Construct ray *DE* not on triangle *ABC* by selecting ray from the straightedge tools.

   Use the selection arrow tool to select point *D* and segment *AB*.

   Choose **Circle by Center and Radius** from the **Construct** menu.

   Construct intersection point *F* of the circle and ray *DE* using the point tool.

   Construct segment *DF* using the segment straightedge tool.

   Use the selection arrow tool to select point *D* and segment *AC*.

   Choose **Circle by Center and Radius** from the **Construct** menu.

   Construct a segment from point *D* to any point on the second circle using the segment straightedge tool.

   Construct segment *FG*.

   Use the selection arrow tool to select the two circles, ray *DE*, and point *E*. Then choose **Hide Objects** from the **Display** menu.

2. Measure angles *A* and *D*. To measure angle *A*, choose the selection arrow tool, select point *C*, hold the shift key down, and select points *A* and *B*. Then choose **Angle** from the **Measure** menu. Repeat for angle *D*. Before selecting an angle, be sure to click anywhere in the work area to deselect the previous points.

3. Measure the lengths of sides *BC* and *FG*. Use the selection arrow tool to select sides *BC* and *FG*. Choose **Length** from the **Measure** menu.

4. Use the translate selection arrow tool to drag vertex *G* and compare the measures of angles *A* and *D* and also the lengths of sides *BC* and *FG*.

5. Drag vertex *G* until the measures of the included angles are congruent.