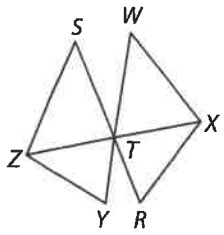
## Example 5 Prove Relationships Using Converse of Hinge Theorem

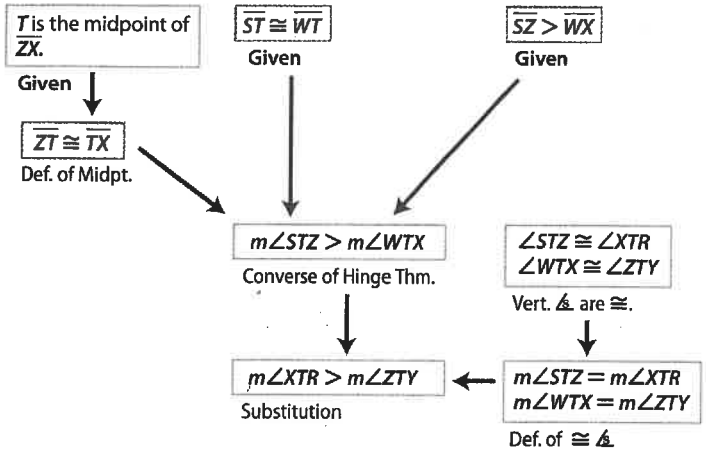
**Write a flow proof.**

**Given:** $T$ is the midpoint of $\overline{ZX}$.
$\overline{ST} \cong \overline{WT}$
$SZ > WX$

**Prove:** $m\angle XTR > m\angle ZTY$




**Flow Proof:**

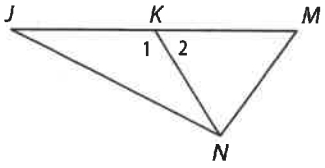



### GuidedPractice

**5.** Write a two-column proof.

**Given:** $\overline{NK}$ is a median of $\triangle JMN$.
$JN > NM$

**Prove:** $m\angle 1 > m\angle 2$

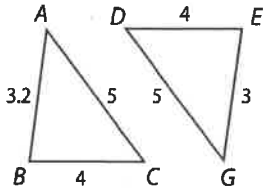



## Check Your Understanding

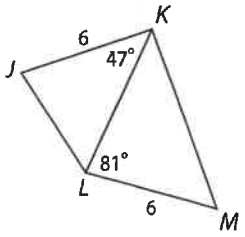
= Step-by-Step Solutions begin on page R14.

**Example 1** **Compare the given measures.**

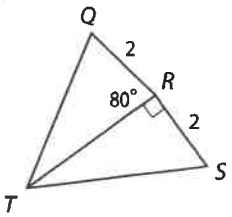
**1.** $m\angle ACB$ and $m\angle GDE$



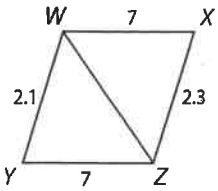

**2.** $JL$ and $KM$




**3** $QT$ and $ST$




**4.** $m\angle XWZ$ and $m\angle YZW$

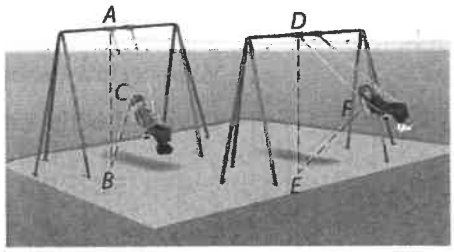


**Example 2**

**5. SWINGS** The position of the swing changes based on how hard the swing is pushed.

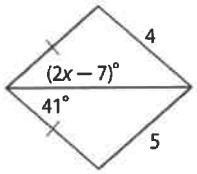
**a.** Which pairs of segments are congruent?

**b.** Is the measure of $\angle A$ or the measure of $\angle D$ greater? Explain.

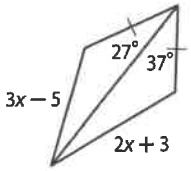



**Example 3** **Find the range of possible values for $x$.**

**6.**

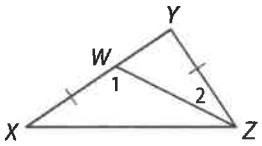



**7.**

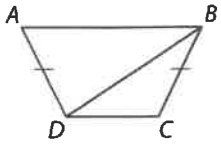



**Examples 4–5** CCSS **ARGUMENTS** **Write a two-column proof.**

**8.** Given: $\triangle YZX$
$\overline{YZ} \cong \overline{XW}$
Prove: $ZX > YW$




**9.** Given: $\overline{AD} \cong \overline{CB}$
$DC < AB$
Prove: $m\angle CBD < m\angle ADB$

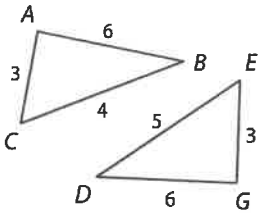



## Practice and Problem Solving

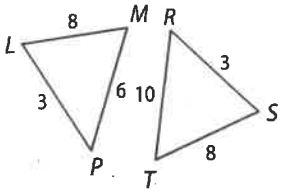
Extra Practice is on page R5.

**Example 1** **Compare the given measures.**

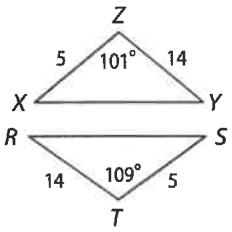
**10.** $m\angle BAC$ and $m\angle DGE$



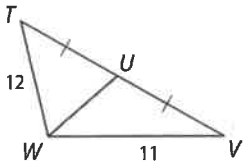

**11.** $m\angle MLP$ and $m\angle TSR$



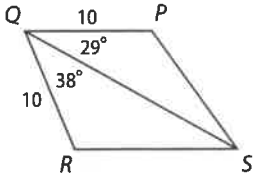

**12.** $SR$ and $XY$



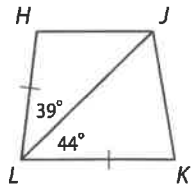

**13.** $m\angle TUW$ and $m\angle VUW$




**14.** $PS$ and $SR$




**15.** $JK$ and $HJ$




**Example 2**

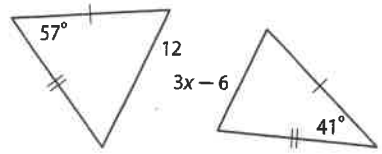
**16. CAMPING** Pedro and Joel are camping in a national park. One morning, Pedro decides to hike to the waterfall. He leaves camp and goes 5 miles east then turns 15° south of east and goes 2 more miles. Joel leaves the camp and travels 5 miles west, then turns 35° north of west and goes 2 miles to the lake for a swim.

**a.** When they reach their destinations, who is closer to the camp? Explain your reasoning. Include a diagram.

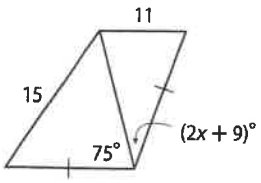
**b.** Suppose instead of turning 35° north of west, Joel turned 10° south of west. Who would then be farther from the camp? Explain your reasoning. Include a diagram.

**Example 3** Find the range of possible values for $x$.

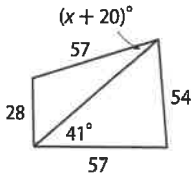
**17.**



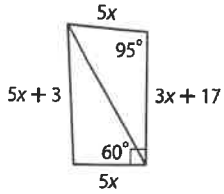

**18.**



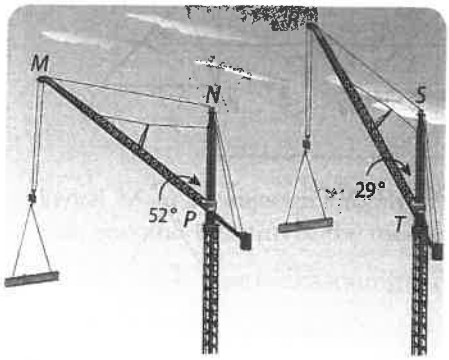

**19**



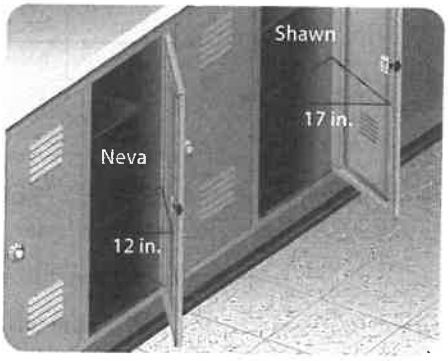

**20.**




**21. CRANES** In the diagram, a crane is shown lifting an object to two different heights. The length of the crane's arm is fixed, and $\overline{MP} \cong \overline{RT}$. Is $\overline{MN}$ or $\overline{RS}$ shorter? Explain your reasoning.



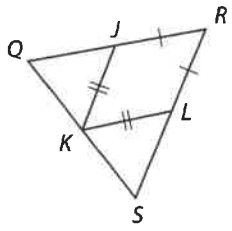

**22. LOCKERS** Neva and Shawn both have their lockers open as shown in the diagram. Whose locker forms a larger angle? Explain your reasoning.




**Examples 4–5** CCSS **ARGUMENTS** Write a two-column proof.

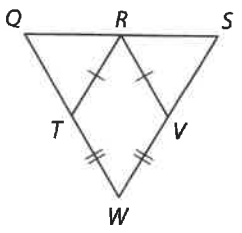
**23.** **Given:** $\overline{LK} \cong \overline{JK}$, $\overline{RL} \cong \overline{RJ}$
$K$ is the midpoint of $\overline{QS}$.
$m\angle SKL > m\angle QKJ$

**Prove:** $RS > QR$



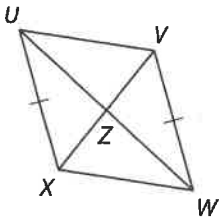

**24.** **Given:** $\overline{VR} \cong \overline{RT}$, $\overline{WV} \cong \overline{WT}$
$m\angle SRV > m\angle QRT$
$R$ is the midpoint of $\overline{SQ}$.

**Prove:** $WS > WQ$




**25.** **Given:** $\overline{XU} \cong \overline{VW}$, $VW > XW$
$\overline{XU} \parallel \overline{VW}$

**Prove:** $m\angle XZU > m\angle UZV$




**26.** **Given:** $\overline{AF} \cong \overline{DJ}$, $\overline{FC} \cong \overline{JB}$
$AB > DC$

**Prove:** $m\angle AFC > m\angle DJB$