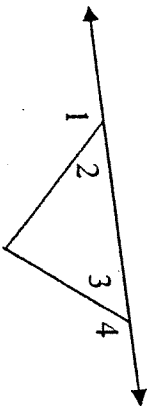


Key (2015)

1. Find the measure of an angle and its supplement if the angle is 15° less than twice its supplement.

2. Given: $\angle 1$ supp $\angle 2$
 $\angle 2 \cong \angle 3$
 $\angle 4$ supp $\angle 3$



Prove: $\angle 1 \cong \angle 4$

$$\begin{aligned} \textcircled{1} \angle 1 \text{ supp } \angle 2 &\rightarrow \textcircled{2} m\angle 1 + m\angle 2 = 180 \\ \angle 4 \text{ supp } \angle 3 &\rightarrow m\angle 4 + m\angle 3 = 180 \end{aligned} \left. \begin{array}{l} \rightarrow \textcircled{3} m\angle 1 + m\angle 2 = m\angle 4 + m\angle 3 \\ \rightarrow \textcircled{4} \angle 2 \cong \angle 3 \end{array} \right\} \rightarrow \textcircled{5} m\angle 2 = m\angle 3$$

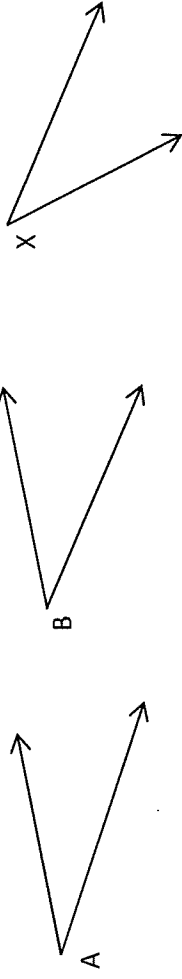
$$\textcircled{6} m\angle 1 + m\angle 2 = m\angle 4 + m\angle 2 \rightarrow \textcircled{7} m\angle 1 = m\angle 4 \rightarrow \textcircled{8} \angle 1 \cong \angle 4$$

(optional)

Reasons

- ① Given
- ② Suppl. \angle s are \angle \angle s that totals 180.
- ③ Substitution Prop.
- ④ Given
- ⑤ \cong \angle s have = measures.
- ⑥ Substitution Prop.
- ⑦ Substitution Prop.
- ⑧ \cong \angle s have = measures.

Congruent complements theorem: If two angles complement the same angle or are complementary to congruent angles, then the two angles are congruent. \longrightarrow \angle s that complement the same \angle s are congruent.



Given: $\angle A$ complement $\angle X$
 $\angle B$ complement $\angle X$.

Prove: $\angle A \cong \angle B$

$$\begin{aligned} \textcircled{1} \angle A \text{ compl. } \angle X &\rightarrow \textcircled{2} m\angle A + m\angle X = 90 && \rightarrow \textcircled{3} m\angle A + m\angle X = m\angle B + m\angle X \\ \angle B \text{ compl. } \angle X &\rightarrow m\angle B + m\angle X = 90 && \end{aligned}$$

$$\textcircled{4} m\angle A = m\angle B \rightarrow \textcircled{5} \angle A \cong \angle B$$

- ① Given
- ② Compl. \angle s are 2 \angle s whose sum is 90° .
- ③ Substitution Prop.
- ④ Subtraction Prop.
- ⑤ \cong \angle s have = measures.