

15. In order for the slanted beams to be equal in length, they must be congruent. The diagram indicates that the base forms a right angle with the perpendicular bisector. We know all right angles are congruent and the 28° angles shown are congruent. A perpendicular bisector forms two equal segments and the vertical beam is congruent to itself. Thus the two right triangles are congruent by ASA. The slanted beams are congruent by CPCTC because all congruent triangles have sides of congruent lengths.

16. Given: $\angle P \cong \angle S$, $\angle Q \cong \angle T$, $\overline{QR} \cong \overline{TU}$

Prove: $\triangle PQR \cong \triangle STU$

Statement	Reason
$\angle P \cong \angle S$ 1) $\angle Q \cong \angle T$ $\overline{QR} \cong \overline{TU}$	1) Given
2) $m\angle R = 180 - m\angle P - m\angle Q$ $m\angle U = 180 - m\angle S - m\angle T$	2) Triangle Angle-Sum Theorem
3) $m\angle U = 180 - m\angle P - m\angle Q$	3) Substitution
4) $\angle R \cong \angle U$	4) Transitive Property of Equality
5) $\triangle PQR \cong \triangle STU$	5) Angle-Side-Angle (ASA)

17. Given: $\angle A \cong \angle C$, $\overline{BX} \cong \overline{DX}$

Prove: $\overline{AX} \cong \overline{CX}$

Statement	Reason
1) $\angle A \cong \angle C$, $\overline{BX} \cong \overline{DX}$	1) Given
2) $\angle AXD \cong \angle BXC$	2) Vertical Angles Theorem
3) $\triangle AXD \cong \triangle BXC$	3) Angle-Angle-Side (AAS)
4) $\overline{AX} \cong \overline{CX}$	4) Corresponding Parts of Congruent Triangles are Congruent (CPCTC).

18. $\triangle ADC \cong \triangle GKJ$ by AAS, $\overline{AC} \cong \overline{GJ}$ by CPCTC; $\triangle ADC \cong \triangle GHJ$ by SAS. Since $ABCD$ and $GHJK$ are composed of corresponding congruent triangles, $ABCD \cong GHJK$.

19. Yes; Because $ABCD \cong EFGH$, there exists a sequence of rigid motions that maps $ABCD$ to $EFGH$. Since rigid motions preserve side length, $\overline{AB} \cong \overline{EF}$, $\overline{BC} \cong \overline{FG}$, $\overline{CD} \cong \overline{GH}$, and $\overline{AD} \cong \overline{EH}$. Rigid motions also preserve angle measures, so $\angle A \cong \angle E$, $\angle B \cong \angle F$, $\angle C \cong \angle G$, and $\angle D \cong \angle H$.