## Written Exercises

Write the name or statement of the definition, postulate, property, or theorem
that justifies the statement about the diagram.

A 1. $AD + DB = AB$

  2. $m\angle 1 + m\angle 2 = m\angle CDB$

  3. $\angle 2 \cong \angle 6$

  4. If D is the midpoint of $\overline{AB}$, then $AD = \frac{1}{2}AB$.

  5. If $\overrightarrow{DF}$ bisects $\angle CDB$, then $\angle 1 \cong \angle 2$.

  6. $m\angle ADF + m\angle FDB = 180$

  7. If $\overline{CD} \perp \overline{AB}$, then $m\angle CDB = 90$.

  8. If $\angle 4 \cong \angle 3$, then $\overrightarrow{DG}$ bisects $\angle BDE$.

  9. If $m\angle 3 + m\angle 4 = 90$, then $\angle 3$ and $\angle 4$ are complements.

 10. If $\angle ADF$ and $\angle 4$ are supplements, then $m\angle ADF + m\angle 4 = 180$.

 11. If $\overline{AB} \perp \overline{CE}$, then $\angle ADC \cong \angle ADE$.

 12. If $\angle 4$ is complementary to $\angle 5$ and $\angle 6$ is complementary to $\angle 5$,
     then $\angle 4 \cong \angle 6$.

 13. If $\angle FDG$ is a right angle, then $\overrightarrow{DF} \perp \overrightarrow{DG}$.

 14. If $\angle FDG \cong \angle GDH$, then $\overrightarrow{DG} \perp \overleftrightarrow{HF}$.

Exs. 1–14

 15. Copy everything shown and complete the proof of Theorem 2-7
     for the case where two angles are supplements of the same angle.

     Given: $\angle 1$ and $\angle 5$ are supplementary;
     $\qquad\;\;\angle 3$ and $\angle 5$ are supplementary.

     Prove: $\angle 1 \cong \angle 3$
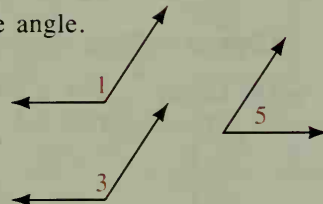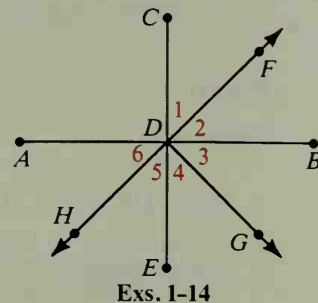
Proof:

Statements	Reasons
1. $\angle 1$ and $\angle 5$ are supplementary; $\angle 3$ and $\underline{\;\;?\;\;}$.	1. $\underline{\;\;?\;\;}$
2. $m\angle 1 + m\angle 5 = 180$; $m\angle 3 + m\angle 5 = 180$	2. $\underline{\;\;?\;\;}$
3. $m\angle 1 + m\angle 5 = m\angle 3 + m\angle 5$	3. $\underline{\;\;?\;\;}$
4. $\qquad m\angle 5 = \qquad m\angle 5$	4. Reflexive Prop.
5. $m\angle 1 = m\angle 3$, or $\angle 1 \cong \angle 3$	5. $\underline{\;\;?\;\;}$

 16. **a.** Are there any angles in the diagram that must be con-
         gruent to $\angle 4$? Explain.
     b. If $\angle 4$ and $\angle 5$ are supplementary, name all angles
         shown that must be congruent to $\angle 4$.