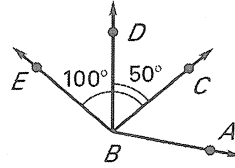


In Exercises 1–3, complete the proof.

1. **GIVEN:**  $\angle ABC \cong \angle CBD$ ,  $m\angle CBD = 50^\circ$ ,  $m\angle CBE = 100^\circ$   
**PROVE:**  $m\angle ABC \cong \angle DBE$

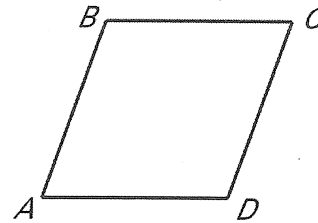


Statements	Reasons
1. $\angle ABC \cong \angle CBD$ , $m\angle CBD = 50^\circ$ , $m\angle CBE = 100^\circ$	1. <u>Given</u>
2. <u><math>m\angle CBD + m\angle DBE = m\angle CBE</math></u>	2. Angle Addition Postulate
3. $50^\circ + m\angle DBE = 100^\circ$	3. <u>Subst</u>
4. $m\angle DBE = 50^\circ$	4. <u>Subtr Prop of Eq.</u>
5. $m\angle CBD = \underline{m\angle DBE}$	5. Substitution Property of Equality
6. <u><math>\angle CBD \cong \angle DBE</math></u>	6. Definition of congruent angles
7. $\angle ABC \cong \angle DBE$	7. <u>Trans. (Not Subst)</u>

2. The lengths of the sides of quadrilateral  $ABCD$  are equal. Prove that the perimeter of  $ABCD$  is equal to  $4AB$ .

**GIVEN:**  $\overline{AB} \cong \overline{BC}$ ,  $\overline{BC} \cong \overline{CD}$ ,  $\overline{CD} \cong \overline{AD}$

**PROVE:** Perimeter of  $ABCD = 4AB$

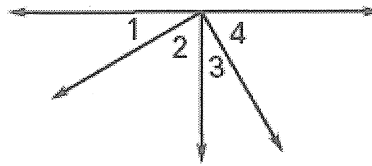


Statements	Reasons
1. $\overline{AB} \cong \overline{BC}$ , $\overline{BC} \cong \overline{CD}$ , $\overline{CD} \cong \overline{AD}$	1. <u>Given</u>
2. $AB = BC$ , $BC = CD$ , $CD = AD$	2. <u>Def of <math>\cong</math> segments</u>
3. $AB = CD$ , $AB = AD$	3. <u>Trans Prop.</u>
4. Perimeter of $ABCD = AB + BC + CD + AD$	4. <u>Def of Perimeter</u>
5. <u><math>P_{ABCD} = AB + AB + AB + AB</math></u>	5. Substitution Property of Equality
6. <u><math>P_{ABCD} = 4AB</math></u>	6. Simplify.

3. GIVEN:  $\angle 1$  and  $\angle 2$  are complementary.

$$\angle 1 \cong \angle 3, \angle 2 \cong \angle 4$$

PROVE:  $\angle 3$  and  $\angle 4$  are complementary.



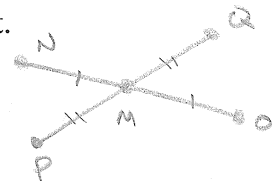
Statements	Reasons
1. $\angle 1$ and $\angle 2$ are complementary.	1. <u>Given</u>
2. $m\angle 1 + m\angle 2 = 90^\circ$	2. <u>Def of comp <math>\angle</math>'s</u>
3. $\angle 1 \cong \angle 3, \angle 2 \cong \angle 4$	3. <u>Given</u>
4. $m\angle 1 = m\angle 3, m\angle 2 = m\angle 4$	4. <u>Def of <math>\cong \angle</math>'s</u>
5. $m\angle 3 + m\angle 2 = 90^\circ$	5. <u>Subst (Steps 2+4)</u>
6. $m\angle 3 + m\angle 4 = 90^\circ$	6. <u>Subst (Steps 4+5)</u>
7. $\angle 3$ and $\angle 4$ are complementary.	7. <u>Def of comp <math>\angle</math>'s</u>

In Exercised 4-5, write a two-column proof.

4. Use the given information to draw a diagram and then prove the statement.

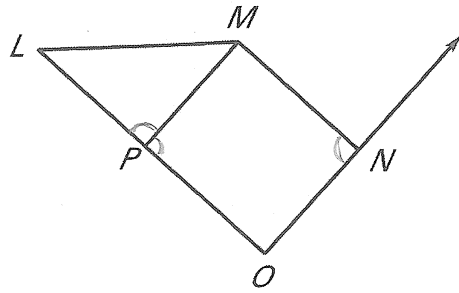
GIVEN:  $\overline{NO} \cong \overline{PQ}$ ,  $M$  is the midpoint of  $\overline{NO}$ .  $M$  is the midpoint of  $\overline{PQ}$ .

PROVE:  $\overline{NM} \cong \overline{PM}$



① $\overline{NO} \cong \overline{PQ}$ , $M$ is mdpt of $\overline{NO} + \overline{PQ}$	① Given
② $NO = PQ$	② Def of $\cong$ segments
③ $NO = NM + MO$ , $PQ = PM + MQ$	③ Seg Add Post
④ $NM + MO = PM + MQ$	④ Subst
⑤ $NM = MO$ , $PM = MQ$	⑤ Def of mdpt
⑥ $NM + NM = PM + PM$	⑥ Subst (Steps 4+5)
⑦ $2NM = 2PM$	⑦ Simplify
⑧ $NM = PM$	⑧ Division Prop of Eq.
⑨ $\overline{NM} \cong \overline{PM}$	⑨ Def of $\cong$ seg's

5. GIVEN:  $\angle LPM \cong \angle MNO$ ,  
 $\angle MNO \cong \angle MPO$   
 PROVE:  $\overline{MP} \perp \overline{LO}$



- ①  $\angle LPM \cong \angle MNO$   
 $\angle MNO \cong \angle MPO$
- ②  $\angle LPM \cong \angle MPO$
- ③  $m\angle LPM = m\angle MPO$
- ④  $m\angle LPM + m\angle MPO = 180$
- ⑤  $m\angle LPM + m\angle LPM = 180$
- ⑥  $2m\angle LPM = 180$
- ⑦  $m\angle LPM = 90$
- ⑧  $\overline{MP} \perp \overline{LO}$

- ① Given
- ② Trans.
- ③ Def of  $\cong$   $\angle$ 's
- ④ Linear Pair Post
- ⑤ Subst
- ⑥ simplify
- ⑦ Division Prop of Eq.
- ⑧ Def of Perp