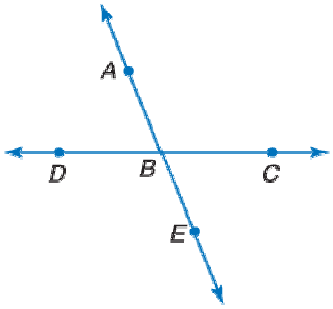
Lesson 3-7

Example 1

Given $\angle ABC$ and $\angle EBD$ are vertical angles.

Prove $m\angle ABC = m\angle EBD$



Solution

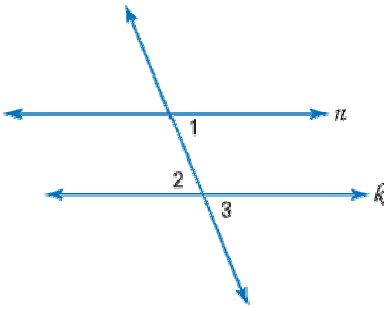
Statements	Reasons
1. $\angle ABC$ and $\angle EBD$ are vertical angles.	1. Given
2. $m\angle ABC + m\angle CBE = 180°$ $m\angle EBD + m\angle CBE = 180°$	2. Angle Addition Postulate
3. $m\angle ABC + m\angle CBE = m\angle EBD + m\angle CBE$	3. Transitive Property of Equality
4. $m\angle ABC = m\angle EBD$	4. Addition Property of Equality

Example 2

SURVEYING Two parallel property lines are cut by a third line. How can the surveyor know that $m\angle 1 = m\angle 2$?

Given $n \parallel k$

Prove $m\angle 1 = m\angle 2$



Solution

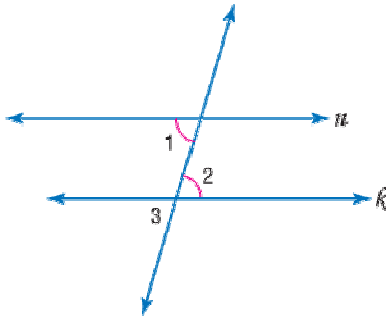
Statements	Reasons
1. $n \parallel k$	1. Given
2. $m\angle 1 = m\angle 3$	2. Parallel Line Postulate
3. $m\angle 2 = m\angle 3$	3. Vertical Angle Theorem
4. $m\angle 1 = m\angle 2$	4. Transitive Property of Equality

Example 3

CARPENTRY A cross-brace is nailed to two wooden beams so that the alternate interior angles formed are equal in measure. How can the carpenter know that the beams are parallel?

Given $m\angle 1 = m\angle 2$

Prove $n \parallel k$



Solution

Statements	Reasons
1. $m\angle 1 = m\angle 2$	1. Given
2. $m\angle 2 = m\angle 3$	2. Vertical Angle Theorem
3. $m\angle 1 = m\angle 3$	3. Transitive Property of Equality
4. $n \parallel k$	4. Corresponding Angles Theorem