Ch. 2

Page 117 Proof Practice

Prove the Common Angles Theorem.
Given: $\angle AXB \cong \angle CXD$
Prove: $\angle AXC \cong \angle BXD$

Statements	Reasons

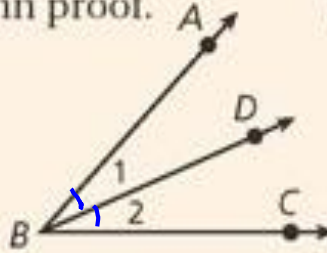| Statements	Reasons
$\angle AXB \cong \angle CXD$	Given
$m\angle AXB = m\angle CXD$	Definition of congruent angles
$m\angle AXB + m\angle BXC = m\angle BXC + m\angle CXD$	Addition Property of equality
$m\angle AXB + m\angle BXC = m\angle AXC$ $m\angle BXC + m\angle CXD = m\angle BXD$	Angle Addition Postulate
$m\angle AXC = m\angle BXD$	Substitution Property of equality
$\angle AXC \cong \angle BXD$	Definition of congruent angles

$\angle AXB \cong \angle CXD$ → $m\angle AXB = m\angle CXD$ → $m\angle AXB + m\angle BXC = m\angle BXC + m\angle CXD$

Given   Def of ≅ ∠s   Add Prop of =

$m\angle AXB + m\angle BXC = m\angle AXC$
$m\angle BXC + m\angle CXD = m\angle BXD$ → $m\angle AXC = m\angle BXD$ → $\angle AXC \cong \angle BXD$

∠ Add. Postulate   Subst. Prop of =   Def of ≅ ∠s
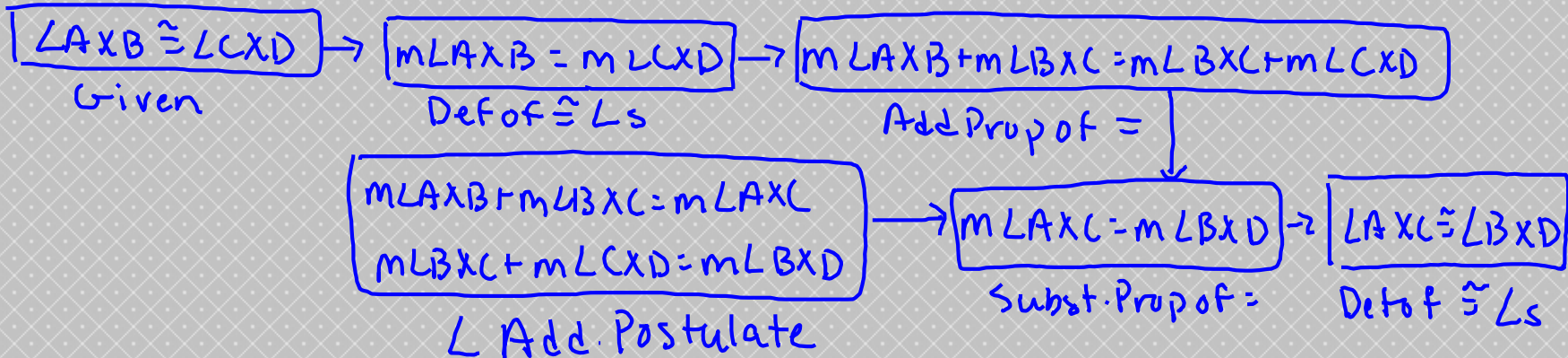
2. Write a plan and a two-column proof.

Given: $\overrightarrow{BD}$ bisects $\angle ABC$.
Prove: $2m\angle 1 = m\angle ABC$

Statements	Reasons

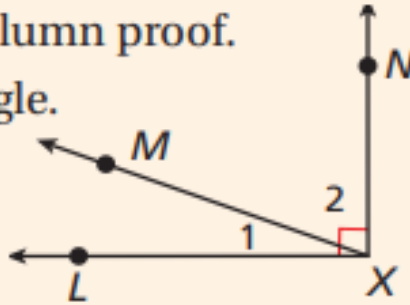| Statements	Reasons
$\overrightarrow{BD}$ bisects $\angle ABC$	Given
$\angle 1 \cong \angle 2$	Definition of angle bisector
$m\angle 1 = m\angle 2$	Definition of congruent angles
$m\angle 1 + m\angle 2 = m\angle ABC$	Angle Addition Postulate
$m\angle 1 + m\angle 1 = m\angle ABC$	Substitution Property of equality
$2m\angle 1 = m\angle ABC$	Combine like terms
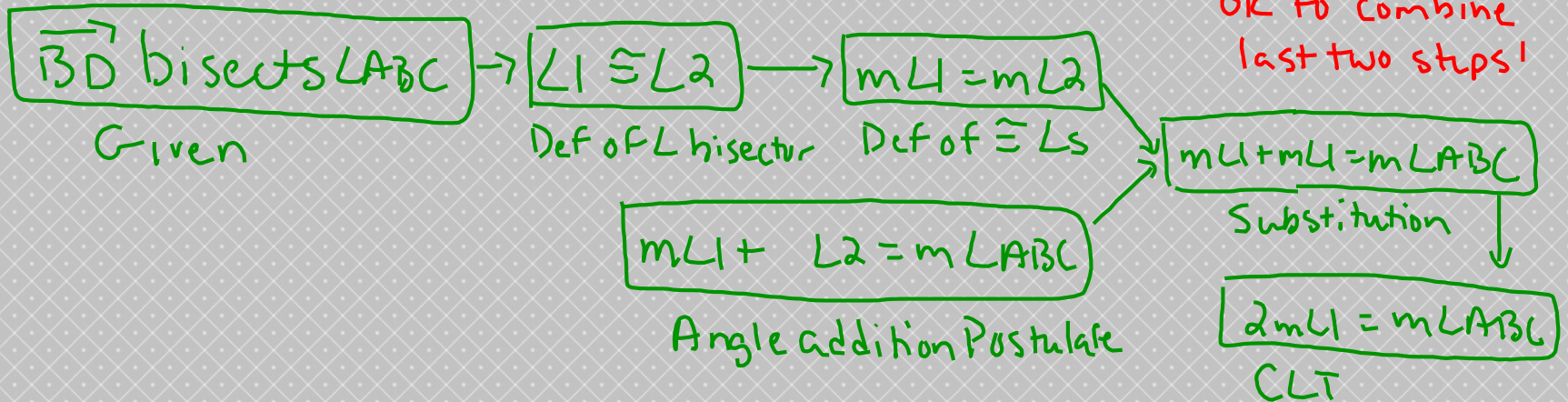
$\overrightarrow{BD}$ bisects $\angle ABC$ → $\angle 1 \cong \angle 2$ → $m\angle 1 = m\angle 2$

Given

Def of $\angle$ bisector   Def of $\cong \angle s$

$m\angle 1 + \angle 2 = m\angle ABC$

Angle addition Postulate

OK to combine last two steps!

$m\angle 1 + m\angle 1 = m\angle ABC$

Substitution

$2m\angle 1 = m\angle ABC$

CLT

3. Write a plan and a two-column proof.

Given: $\angle LXN$ is a right angle.

Prove: $\angle 1$ and $\angle 2$ are complementary.

Statements	Reasons

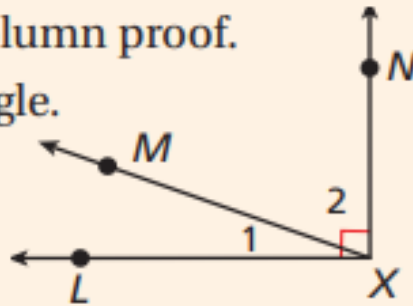**3.** Write a plan and a two-column proof.

Given: $\angle LXN$ is a right angle.

Prove: $\angle 1$ and $\angle 2$ are complementary.

Statements	Reasons
$\angle LXN$ is a right angle	Given
$m\angle LXN = 90$	Definition of right angle
$m\angle 1 + m\angle 2 = m\angle LXN$	Angle Addition Postulate
$m\angle 1 + m\angle 2 = 90$	Transitive Property of equality
$\angle 1$ and $\angle 2$ are complementary	Definition of complementary

$\angle LXN$ is a right $\angle$ → $m\angle LXN = 90$
Given   Def. of right $\angle$

$m\angle 1 + m\angle 2 = m\angle LXN$
Angle Addition Postulate

$m\angle 1 + m\angle 2 = 90$
Trans prop of = (or subst.)

$m\angle 1$ and $m\angle 2$ are complementary
Def. of Complementary