NAME Key Date _____ Pd __

3.4 Perpendicular Line Proofs DAY TWO CYU

☑ Use when you get it right all by yourself

S Use when you did it all by yourself, but made a silly mistake

H Use when you could do it alone with a little help from teacher or peer

G Use when you completed the problem in a group

X Use when a question was attempted but wrong (get help)

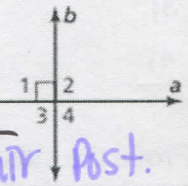
N Use when a question was not even attempted

CONCEPTS	BASIC	INTERMEDIATE	ADVANCED
Perpendicular Lines/Rays/Segments		1, 2, 3	4, 5
Right angles		1, 2, 3	4, 5
Complementary angles		2, 3	4, 5
Angle Add. Postulate		3	4, 5
Parallel Lines			4
Linear Pair/Vertical Angles		1	4, 5
Congruent Angles			4, 5
Line Perpendicular Theorem			4, 5
Perpendicular Transversal Theorem			4, 5
Lines Perpendicular to a Transversal Theorem			4, 5

1. If two intersecting lines are perpendicular, then they intersect to form four right angles.

Given $a \perp b$

Prove $\angle 1, \angle 2, \angle 3$, and $\angle 4$ are right angles.



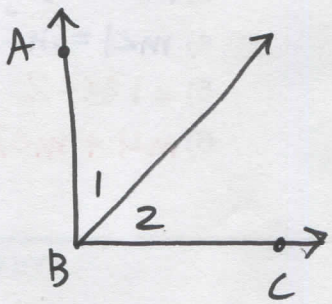
Statements	Reasons
1. $a \perp b$	1. given
2. $\angle 1$ is a Rt $\angle$	2. Def of $\perp$ $\Leftrightarrow$
3. $\angle 1 \cong \angle 4, \angle 2 \cong \angle 3$	3. Def of Vertical $\angle$'s
4. $m\angle 1 = 90°$ $m\angle 2 = m\angle 3$	4. Def of Rt $\angle$
5. $m\angle 1 = m\angle 4$	5. If $\cong \Rightarrow =$
6. $m\angle 4 = 90°$	6. Substitution POE
7. $\angle 1$ & $\angle 2$; $\angle 3$ & $\angle 4$ are a linear pair	7. Def of Linear pair
8. $m\angle 1 + m\angle 2 = 180°$ $m\angle 3 + m\angle 4 = 180°$	8. Linear Pair Post.
9. $90 + m\angle 2 = 180°$ $m\angle 3 + 90 = 180°$	9. Substitution POE
10. $m\angle 2 = 90°$; $m\angle 3 = 90°$	10. Subtraction POE
11. $\angle 1, \angle 2, \angle 3$, & $\angle 4$ are Rt $\angle$'s	11. Def. of Rt $\angle$'s

2. If two sides of two adjacent acute angles are perpendicular, then the angles are complementary.

Draw a visual!

Given $\overrightarrow{BA} \perp \overrightarrow{BC}$

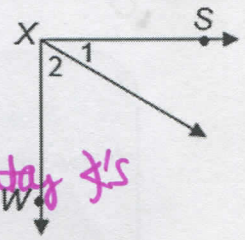
Prove $\angle 1$ and $\angle 2$ are complementary.



Statements	Reasons
1. $\overrightarrow{BA} \perp \overrightarrow{BC}$	1. Given
2. $\angle ABC$ is a Rt $\angle$	2. Def of $\perp$ $\Leftrightarrow$
3. $m\angle ABC = 90°$	3. Def. of Rt $\angle$'s
4. $m\angle 1 + m\angle 2 = m\angle ABC$	4. $\angle$ Add. Post.
5. $m\angle 1 + m\angle 2 = 90°$	5. Transitive POE / Substitution POE
6. $\angle 1$ & $\angle 2$ are comp.	6. Def of complementary $\angle$'s

3. Given: $\angle 1$ & $\angle 2$ are Complementary

Prove: $\overline{SX} \perp \overline{WX}$

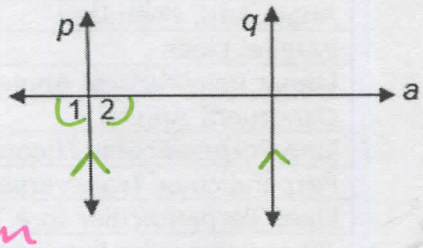


Statements	Reasons
1) $\angle 1$ & $\angle 2$ are Complementary	1) given
2) $m\angle 1 + m\angle 2 = 90$	2) Def. of complementary ∡'s
3) $m\angle WXS = m\angle 1 + m\angle 2$	3) ∡ Add. Post.
4) $m\angle WXS = 90$	4) Substitution POE
5) $\angle WXS$ is right	5) Def of Rt ∡'s
6) $\overline{SX} \perp \overline{WX}$	6) Def of ⊥ segs

4. Given: $\angle 1 \cong \angle 2$

$p \parallel q$

Prove: $q \perp a$



Statements	Reasons
1) $\angle 1 \cong \angle 2$; $p \parallel q$	1) given
2) $p \perp a$	2) Linear Pair ⊥ Thm

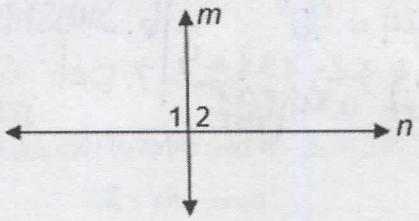
5. Prove the statement: If two coplanar lines are perpendicular, then they form a pair of congruent, supplementary angles.

First write the given(hypothesis) and the prove(conclusion) using the diagram.

Given: $m \perp n$

Prove: $\angle 1 \cong \angle 2$ ✓ and $m\angle 1 + m\angle 2 = 180°$ ✓

Statements	Reasons
1) $m \perp n$	1) given
2) $\angle 1$ & $\angle 2$ R Rt ∡'s	2) Def of ⊥ ⇔
3) $m\angle 1 = 90°$; $m\angle 2 = 90°$	3) Def. of Rt ∡'s
4) $m\angle 1 = m\angle 2$	4) Substitution POE
5) $\angle 1 \cong \angle 2$	5) If = ⇒ ≅
6) $m\angle 1 + m\angle 2 = 180°$	6) Def of Linear Pair (Linear Pair Post.)



CYU Reflection: *How far can you go: basic, intermediate, or advanced?*

Rate your mastery level!

How confident are you with the skills this CYU covered? Circle the score you would give yourself.

1 2	3 4 5	6 7	8
Basic	Intermediate	Advanced	Solved ALL!