

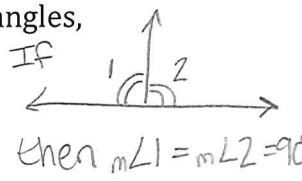
TOPIC: 3.6 Prove Theorems About Perpendicular Lines NAME: Mrs. H.  
 DATE: KEY

ESSENTIAL QUESTION: What additional relationships form with perpendiculars?

QUESTIONS:

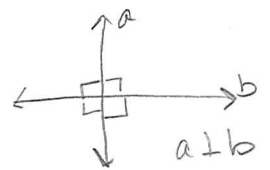
**Theorem 3.8:**

If two lines intersect to form a linear pair of congruent angles, then the lines are perpendicular.



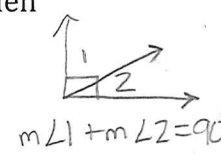
**Theorem 3.9:**

If two lines are perpendicular, then they intersect to form 4 right angles.



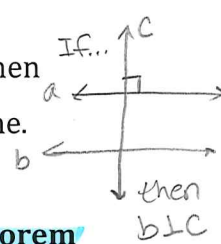
**Theorem 3.10:**

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



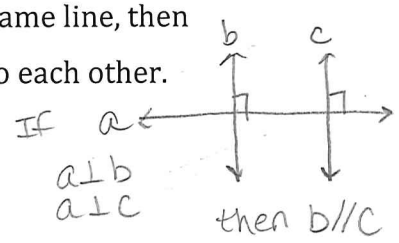
**Theorem 3.11: Perpendicular Transversal Theorem**

If a transversal is perpendicular to one of two parallel lines, then it is perpendicular to the other line.



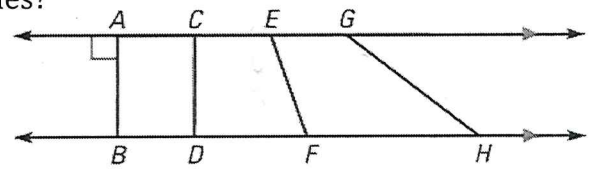
**Theorem 3.12: Lines Perpendicular to a Transversal Theorem**

In a plane, if two lines are perpendicular to the same line, then they are parallel to each other.



A1. Which segment is considered to be the distance between the two lines?

AB



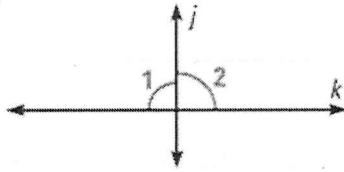
SUMMARY: Perpendiculars form: ①  $\cong$   $\angle$  in linear pairs (Thm 3.8)  
 ② four rt. angles (Thm 3.9)  
 ③ Adjacent, acute complementary angles (Thm 3.10)  
 ④ Additional  $\perp$  with  $\parallel$  lines (Thm 3.11)  
 ⑤  $\parallel$  lines if  $\perp$  to two lines (Thm 3.12)

\* Shortest distance between a pt. and line or 2 lines is along the perpendicular

QUESTIONS:

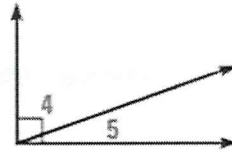
**A2. Write the theorem that justifies the statement.**

a.  $j \perp k$



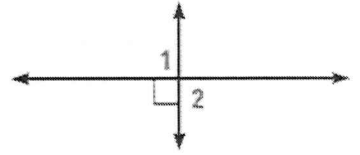
Thm 3.8

b.  $\angle 4$  and  $\angle 5$  are complementary



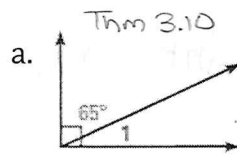
Thm 3.10

c.  $\angle 1$  and  $\angle 2$  are right angles



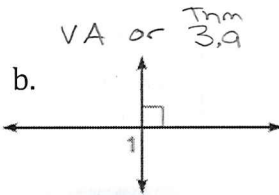
Thm 3.9

**A3. Find  $m\angle 1$ .**

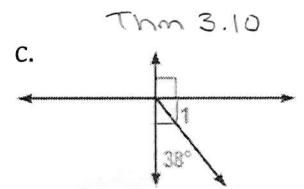


$$\begin{array}{r} 90 \\ - 65 \\ \hline 25 \end{array}$$

$$m\angle 1 = 25^\circ$$



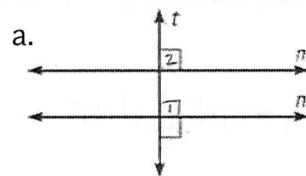
$$m\angle 1 = 90^\circ$$



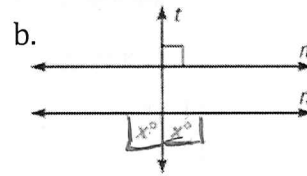
$$\begin{array}{r} 90 \\ - 38 \\ \hline 52 \end{array}$$

$$m\angle 1 = 52^\circ$$

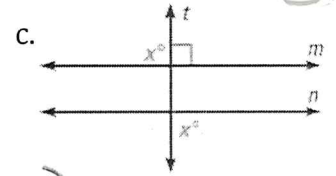
**A4. Explain how would you show that  $m \parallel n$ .**



$t \perp n \therefore$  all 4  $\angle$ 's  $= 90^\circ$   
If CA are  $\cong$ , then  $m \parallel n$   
(Post 16)

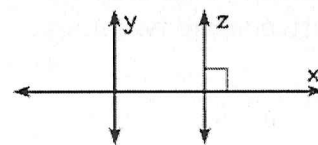


$t \perp n$  (Thm 3.8)  
 $\therefore$  4 right  $\angle$ 's (3.9)  
AEA converse  
 $\therefore n \parallel m$



AEA  
converse

A5. Explain why the statement in the figure is incorrect.

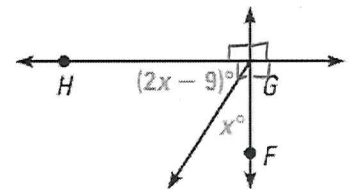


Lines y and z are parallel.



$z \perp x$  but no angles are given at the intersection of line y and x  $\therefore$  no conclusion can be made

A6. In the diagram,  $\overline{FG} \perp \overline{GH}$ . Find the value of x.



$$x + 2x - 9 = 90 \quad (\text{Thm 3.10})$$

$$3x = 99$$

$$x = 33$$

\* y would have to be  $\perp$  to x for  $y \parallel z$