

Geometry

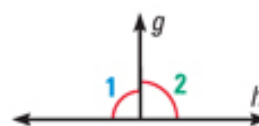
Notes Section 3.6

Prove Theorems about Perpendicular Lines

THEOREM 3.8

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

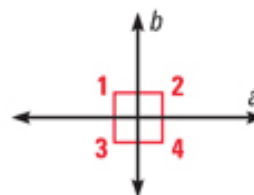
If $\angle 1 \cong \angle 2$, then $g \perp h$.



THEOREM 3.9

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

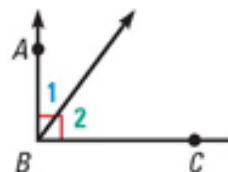
If $a \perp b$, then $\angle 1$, $\angle 2$, $\angle 3$, and $\angle 4$ are right angles.



THEOREM 3.10

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

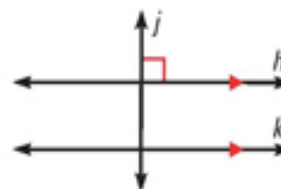
If $\overrightarrow{BA} \perp \overrightarrow{BC}$, then $\angle 1$ and $\angle 2$ are complementary.



THEOREM 3.11 Perpendicular Transversal Theorem

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

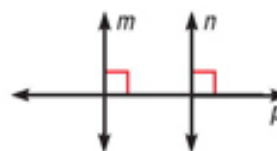
If $h \parallel k$ and $j \perp h$, then $j \perp k$.



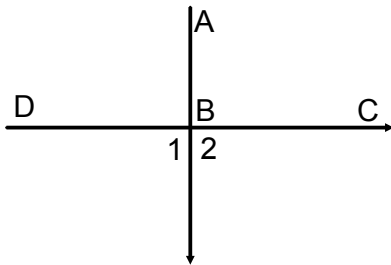
THEOREM 3.12 Lines Perpendicular to a Transversal Theorem

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

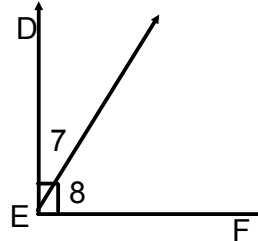
If $m \perp p$ and $n \perp p$, then $m \parallel n$.



EXAMPLE 1 $AB \perp BC$. What can you conclude about $\angle 1$ and $\angle 2$?



EXAMPLE 2 Complete the following proofs.



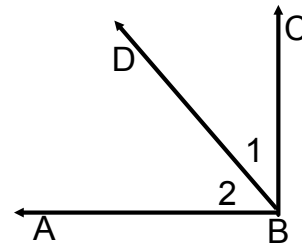
a) Given: $ED \perp EF$

Prove: $\angle 7$ and $\angle 8$ are complementary

- | | |
|--|----------|
| 1. $ED \perp EF$ | 1. _____ |
| 2. $\angle DEF$ is a right angle | 2. _____ |
| 3. $m\angle DEF = 90^\circ$ | 3. _____ |
| 4. $m\angle 7 + m\angle 8 = m\angle DEF$ | 4. _____ |
| 5. $m\angle 7 + m\angle 8 = 90^\circ$ | 5. _____ |
| 6. $\angle 7$ and $\angle 8$ are complementary | 6. _____ |

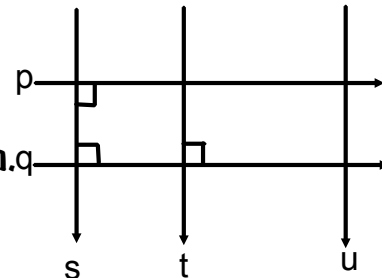
a) Given: $\angle 1$ and $\angle 2$ are complementary

Prove: $BA \perp BC$



1. $\angle 1$ and $\angle 2$ are complementary 1. _____
2. $m\angle 1 + m\angle 2 = 90^\circ$ 2. _____
3. $m\angle ABC = m\angle 1 + m\angle 2$ 3. _____
4. $m\angle ABC = 90^\circ$ 4. _____
5. $\angle ABC$ is a right angle 5. _____
6. $BA \perp BC$ 6. _____

EXAMPLE 3 Determine which line, if any, must be parallel in the diagram. Explain.



EXAMPLE 4 The sculpture is drawn on a graph where units are measured in inches. What is the approximate length of SR, the depth of a seat?

