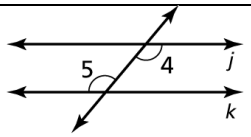
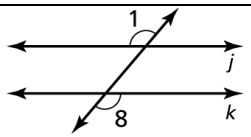
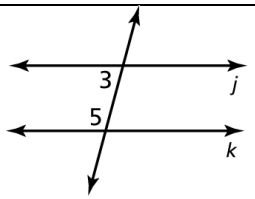
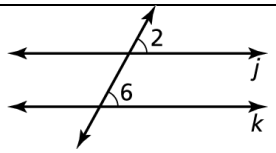
NOTES 3.3 & 3.4

PROVING LINES PARALLEL & PERPENDICULAR LINES

Objective:_____

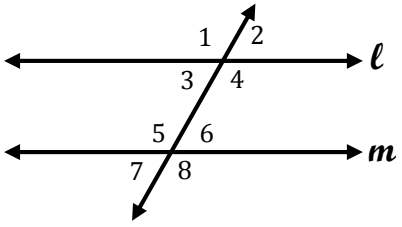
_____

THEOREM	DESCRIPTION	PICTURE	CONCLUSION
Converse of the Alternate Interior Angles Theorem	If two lines are cut by a transversal so the alternate interior angles are congruent, then the lines are parallel.		
Converse of the Alternate Exterior Angles Theorem	If two lines are cut by a transversal so the alternate exterior angles are congruent, then the lines are parallel.		
Converse of the Same-Side Interior Angles Theorem	If two lines are cut by a transversal so the same-side interior angles are supplementary, then the lines are parallel.	 ∠3 and ∠5 are supplementary	
Converse of the Same-Side Exterior Angles Theorem	If two lines are cut by a transversal so the same-side exterior angles are supplementary, then the lines are parallel.		
Converse of the Corresponding Angles Theorem	If two lines are cut by a transversal so the corresponding angles are congruent, then the lines are parallel.		

Use the theorems and the given information to show that $\ell \parallel m$.

EXAMPLE 1:

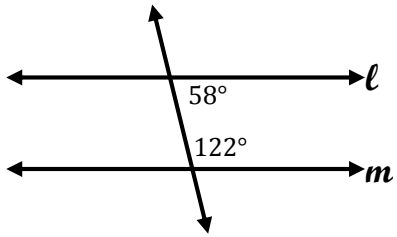
Given: $\angle 4 \cong \angle 5$



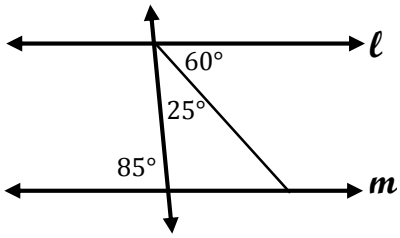
_____

Is it possible to prove that lines ℓ and m are parallel? If so, state the postulate or theorem used.

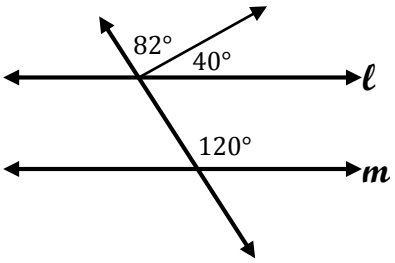
EXAMPLE 2:



EXAMPLE 3:

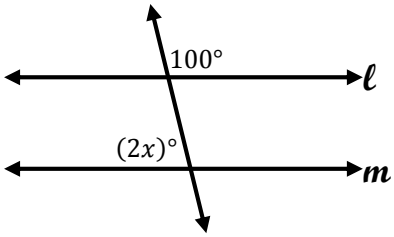


EXAMPLE 4:

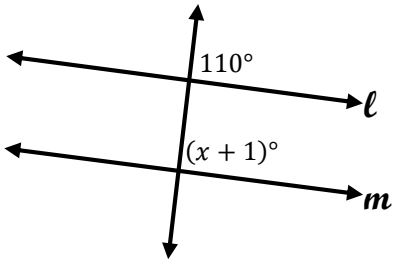


Find the value of x that makes $\ell \parallel m$.

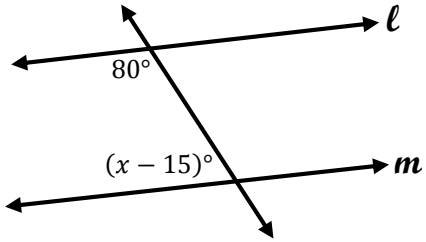
EXAMPLE 5:



EXAMPLE 6:



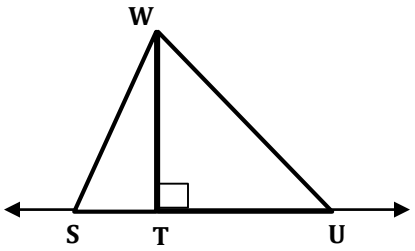
EXAMPLE 7:



Notes 3.3 & 3.4 (Continued)

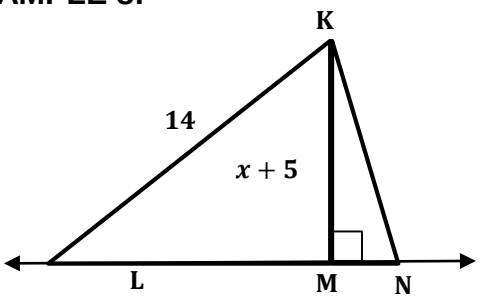
CONCEPT	DESCRIPTION	DIAGRAM
Perpendicular Bisector		

The distance from a point to a line is the length of the shortest segment from the point to the line. It is the length of the perpendicular segment that joins them.



The shortest segment from W to $\overleftrightarrow{SU}$ is $\overline{WT}$.

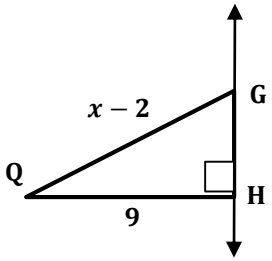
EXAMPLE 8:



Name the shortest segment from point K to $\overleftrightarrow{LN}$.

Write and solve an inequality for x.

EXAMPLE 9:



Name the shortest segment from point Q to $\overleftrightarrow{GH}$.

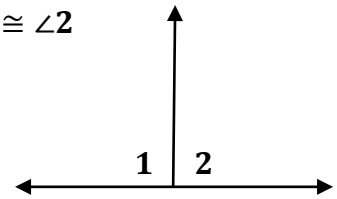
Write and solve an inequality for x.

THEOREM	EXAMPLE
If two intersecting lines form a linear pair of congruent angles, then the lines are perpendicular.	
Perpendicular Transversal Theorem In a plane, if a transversal is perpendicular to one of two parallel lines, then it is perpendicular to the other line.	
If two coplanar lines are perpendicular to the same line, then the two lines are parallel to each other.	

What can you conclude from the given information? State the reason for your conclusion.

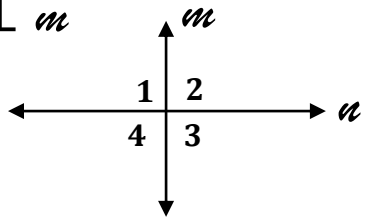
EXAMPLE 10:

$\angle 1 \cong \angle 2$



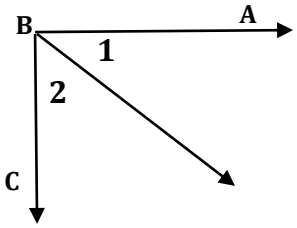
EXAMPLE 11:

$n \perp m$



EXAMPLE 12:

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



Use the diagram to answer the following.

EXAMPLE 13: Is $r \parallel s$?

EXAMPLE 14: Is $m \parallel n$?

EXAMPLE 15: Is $s \parallel t$?