

Practice – Proofs Involving Parallel and Perpendicular Lines **No Textbook Correlation**

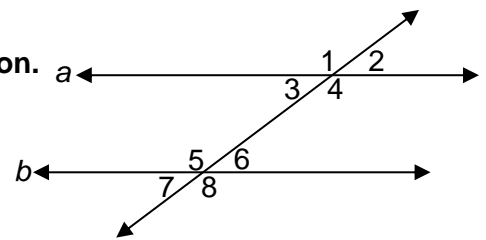
Name _____ Date _____ Period _____

Choose the word(s) that best completes the statements.

1. If two lines are cut by a transversal so that alternate interior angles are (congruent, supplementary, complementary), then the lines are parallel.
2. If two lines are cut by a transversal so that same-side interior angles are (congruent, supplementary, complementary), then the lines are parallel.
3. If two lines are cut by a transversal so that (alternate interior, alternate exterior, corresponding) angles are congruent, then the lines are parallel.
4. If two coplanar lines are perpendicular to the same line, then the two lines are (perpendicular, parallel, skew) to each other.

a || b. State the postulate or theorem that justifies each conclusion.

Example: $\angle 4 \cong \angle 8$ because || lines \rightarrow corresponding \angle s \cong

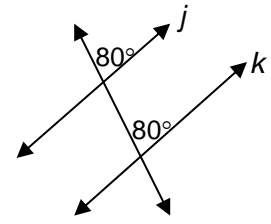
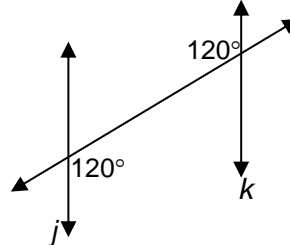
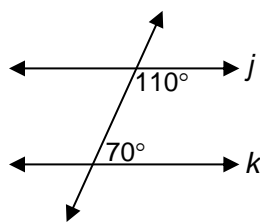
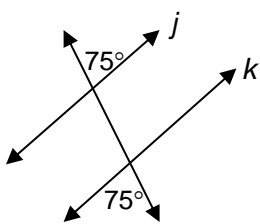


5. $\angle 1 \cong \angle 8$ _____
6. $\angle 3 \cong \angle 7$ _____
7. $\angle 4$ supplementary to $\angle 6$ _____
8. $\angle 3$ supplementary to $\angle 4$ _____
9. $\angle 7 \cong \angle 6$ _____

State the postulate or theorem (shorthand) that allows you to conclude that $j || k$.

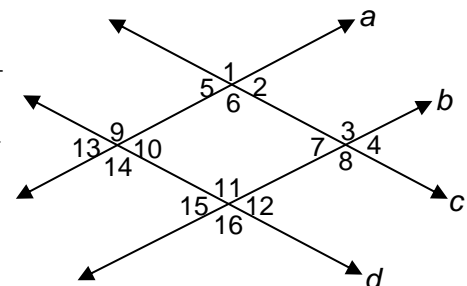
Example: corr. \angle 's $\cong \rightarrow ||$ lines

10. _____ 11. _____ 12. _____ 13. _____



Use the figure and the given information to determine which lines, if any, are parallel. Justify using a theorem or postulate.

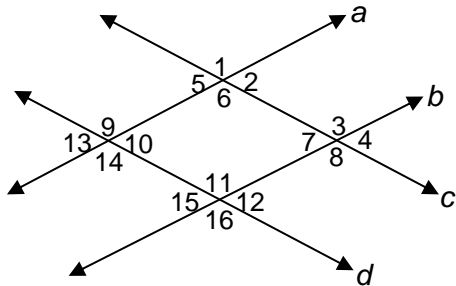
14. $\angle 9 \cong \angle 16 \rightarrow$ _____ $||$ _____ because _____
15. $\angle 5 \cong \angle 7 \rightarrow$ _____ $||$ _____ because _____
16. $\angle 14 \cong \angle 16 \rightarrow$ _____ $||$ _____ because _____
17. $\angle 1 \cong \angle 16 \rightarrow$ _____ $||$ _____ because _____
18. $\angle 5 \cong \angle 10 \rightarrow$ _____ $||$ _____ because _____



Fill in the missing statements and reasons in each proof shown below. You must mark the diagram for credit.

19. Given: $a \parallel b$
 $c \parallel d$

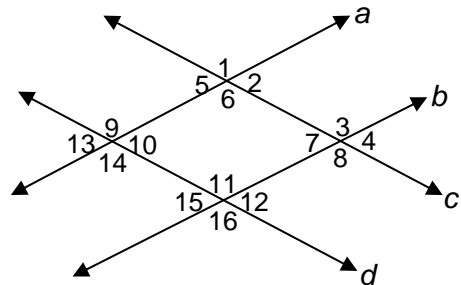
Prove: $\angle 1 \cong \angle 16$



Statements	Reasons
1)	1) given
2) $\angle 1 \cong \angle 8$	2)
3)	3) given
4) $\angle 8 \cong \angle 16$	4)
5)	5) Transitive prop. \cong

20. Given: $a \parallel b$
 $c \parallel d$

Prove: $\angle 9 \cong \angle 8$

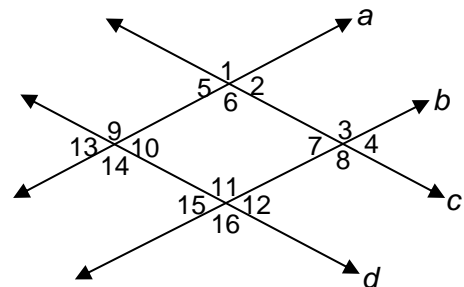


Statements	Reasons
1)	1) given (be careful)
2) $\angle 9 \cong \angle 6$	2)
3)	3) given
4)	4)
5) $\angle 9 \cong \angle 8$	5)

21. Given: $a \parallel b$
 $c \parallel d$

Prove: $m\angle 2 + m\angle 11 = 180^\circ$

Statements	Reasons
1)	1) given
2) $\angle 2$ & $\angle 3$ are supplementary	2)
3)	3)
4)	4)
5)	5)
6)	6)
7)	7)

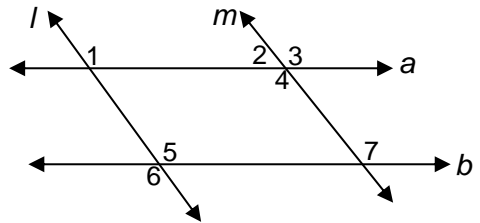


Honors Geometry: Chapter 3 – Proofs Involving Parallel and Perpendicular Lines

22. Given: $l \parallel m$

$$\angle 1 \cong \angle 7$$

Prove: $a \parallel b$

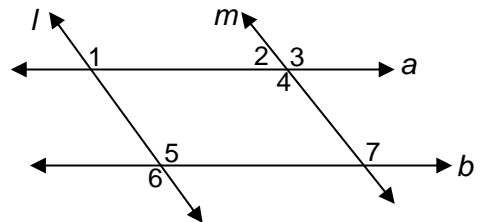


Statements	Reasons
1) $l \parallel m$	1) given
2)	2)
3)	3)
4)	4)
5)	5)

23. Given: $a \parallel b$

$$\angle 5 \text{ is supplementary to } \angle 2$$

Prove: $l \parallel m$

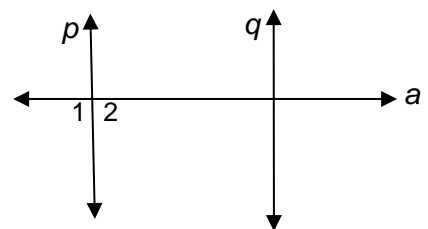


Statements	Reasons
1) $\angle 5$ supplementary $\angle 2$	1)
2)	2)
3) $a \parallel b$	3)
4) $\angle 1 \cong \angle 5$	4)
5)	5)
6) $m\angle 1 + m\angle 2 = 180^\circ$	6)
7)	7)
8) $l \parallel m$	8)

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

$$p \parallel q$$

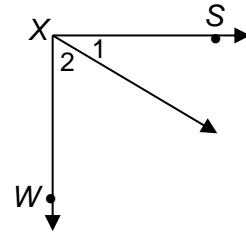
Prove: $q \perp a$



Statements	Reasons
1)	1)
2)	2)
3)	3)
4)	4)

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

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

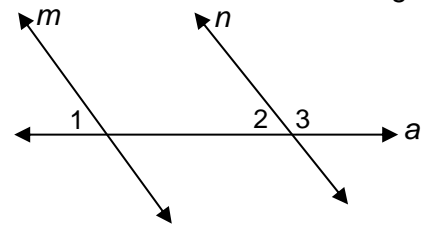


Statements	Reasons
1) $\angle 1$ & $\angle 2$ are Complementary	1)
2) $m\angle 1 + m\angle 2 = 90$	2)
3) $m\angle WXS = m\angle 1 + m\angle 2$	3)
4) $m\angle WXS = 90$	4)
5) $\angle WXS$ is right	5)
6) $\overline{SX} \perp \overline{WX}$	6)

26. Prove the statement: If two parallel lines are cut by a transversal, then the same-side exterior angles are supplementary.

Given: _____

Prove: _____



Statements	Reasons
1)	1)
2)	2)
3)	3)
4)	4)
5)	5)
6)	6)
7)	7)

27. 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: _____

Prove: _____ and _____

Statements	Reasons
1)	1)
2)	2)
3)	3)
4)	4)
5)	5)
6)	6)

