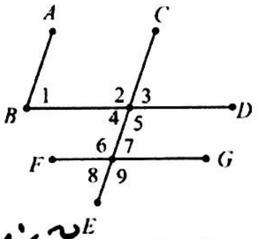
SM2H 7.3 Proving Lines Parallel Notes

Ways to Prove Lines are Parallel:

1. If two lines are cut by a transversal and corresponding angles are congruent, then the lines are parallel.
2. If two lines are cut by a transversal and alternate interior angles are congruent, then the lines are parallel.
3. If two lines are cut by a transversal and alternate exterior angles are congruent, then the lines are parallel.
4. If two lines are cut by a transversal and same side interior angles are supplementary, then the lines are parallel.

Given the following figure, determine which set of line segments must be parallel given the following information. If no lines are parallel say none. **State the postulate or theorem that justifies your answer.**



a) $\angle 1 \cong \angle 3$ $\overline{AB} \parallel \overline{CE}$ Correspdling $\angle$'s $\cong$

b) $\angle 2 \cong \angle 9$ $\overline{BD} \parallel \overline{FG}$ Alt. Ext. $\angle$'s $\cong$

c) $\angle 4 \cong \angle 3$ none vertical $\angle$'s $\cong$

d) $\angle 5 \cong \angle 6$ $\overline{BD} \parallel \overline{FG}$ ALT INT. $\angle$'s $\cong$

e) $m\angle 1 + m\angle 2 = 180$ $\overline{AB} \parallel CE$ Same side INT $\angle$'s supplementary

f) $\angle 1 \cong \angle 4$ $\overline{AB} \parallel \overline{CE}$ Alt. INT $\angle$'s $\cong$

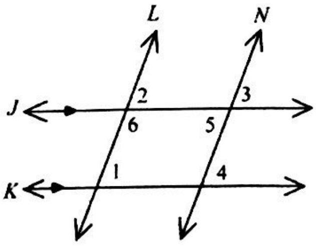
g) $\angle 1 \cong \angle 5$ none

h) $m\angle 4 + m\angle 6 = 180$ $\overline{BD} \parallel \overline{FG}$ same side Int $\angle$'s supplementary

i) $m\angle 4 + m\angle 2 = 180$ none

j) $\angle 5 \cong \angle 9$ $\overline{BD} \parallel FG$ Corresponding $\angle$'s $\cong$

Which pairs of angles, if shown congruent or supplementary, would give $L \parallel N$?



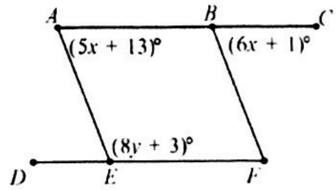
k) If $\angle$ 2 $\cong \angle$ 5, then $L \parallel N$ by Alt. Int. $\angle$'s $\cong$.

l) If $\angle$ 2 $\cong \angle$ 3, then $L \parallel N$ by corresponding $\angle$'s $\cong$.

m) If $\angle$ 1 $\cong \angle$ 4, then $L \parallel N$ by Corresponding $\angle$'s $\cong$.

n) If $\angle$ 6 is supplementary to $\angle$ 5, then $L \parallel N$ by same side interior $\angle$'s supplementary

Use the following figure to answer a and b.



a) Find the value of x that makes $\overline{AE} \parallel \overline{BF}$.

$5x+13=6x+1$

$12=x$

b) Find the value of y that makes $\overline{AC} \parallel \overline{DF}$.

$5x+13+8y+3=180$

$5\cdot 12+13+8y+3=180$

$8y=104$

$y=13$

What theorem did you use to show that $\overline{AE} \parallel \overline{BF}$?

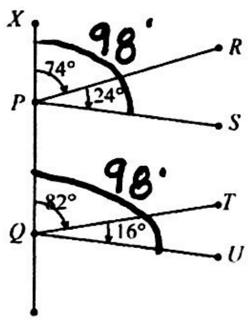
Corresponding ∠'s ≅

What theorem did you use to show that $\overline{AC} \parallel \overline{DF}$?

Same Side Int. ∠'s Supplementary

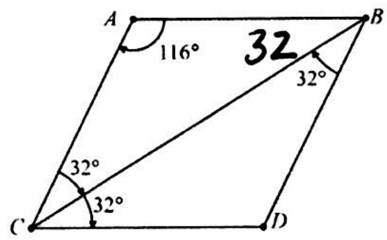
Which segments, if any, are parallel?

c)



$\overline{PS} \parallel \overline{QU}$

d)



$\overline{AC} \parallel \overline{BD}$

$\overline{AB} \parallel \overline{CD}$

Explain:

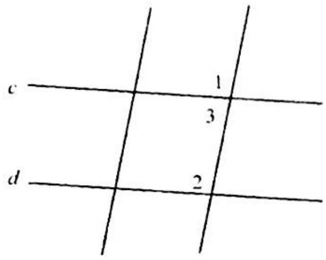
Corresponding ∠'s ≅

Explain:

both by alternate interior ∠'s ≅

1. Given $\angle 3$ & $\angle 2$ are supplementary, prove $\angle 1 \cong \angle 2$.

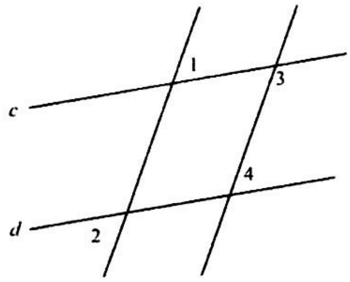
Statements	Reasons
1. $\angle 3$ + $\angle 2$ Supplementary	1. Given
2. c ∥ d	2. same side interior angles supplementary
3 $\angle 1 \cong \angle 2$	3. corresponding $\angle$'s $\cong$



2. Given m$\angle 3$ + $\angle 4$ +180 and m$\angle 1$= (7x-6)°, m$\angle 2$= (x+18)°. Prove x = ~~2~~ 4. Hint: You must prove the c & d are parallel.

≅

Statements	Reasons
1. m$\angle 3$+m$\angle 4$=180	1. Given
2. c ∥ d	2. Same side interior $\angle$'s supplementary
3. $\angle 1 \cong \angle 2$	3. Alternate exterior $\angle$'s $\cong$
4. m$\angle 1$= 7x-6 m$\angle 2$=x+18	4. Given
5. 7x-6=x+18	5. Substitution
6. 6x-6=18	6. Subtraction Prop. of Equality
7. 6x=24	7. Addition Prop. of Equality
8. x=4	8. Division Prop. of Equality



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