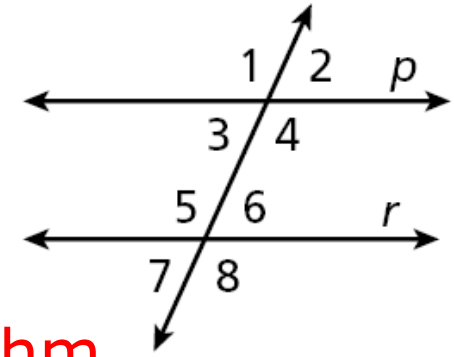
3-3 Proving Lines Parallel

Bellwork (PROF. CHECK TODAY!!!)



Name the postulate or theorem that proves *p* || *r*.

1. ∠4 ≅ ∠5 Conv. of Alt. Int. ∠s Thm.

2. ∠2 ≅ ∠7 Conv. of Alt. Ext. ∠s Thm.

3. ∠3 ≅ ∠7 Conv. of Corr. ∠s Post.

4. ∠3 and ∠5 are supplementary.

Conv. of Same-Side Int. ∠s Thm.

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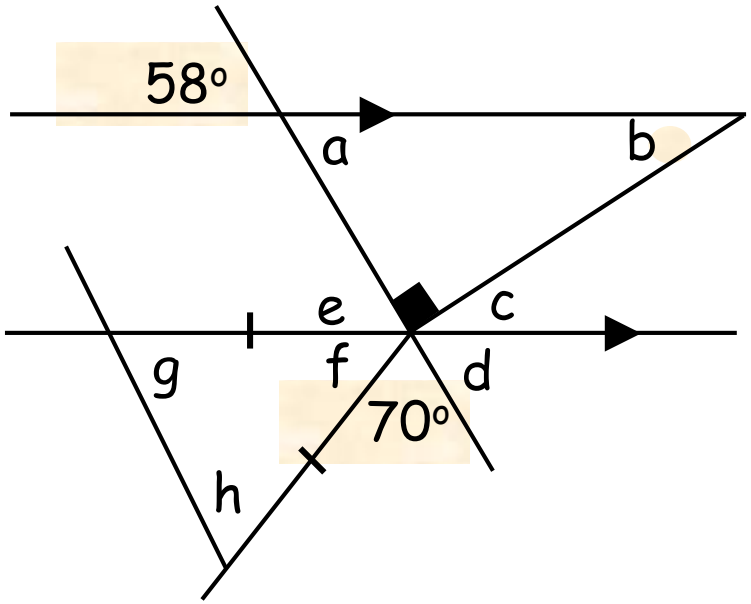
Find all missing angle measures.



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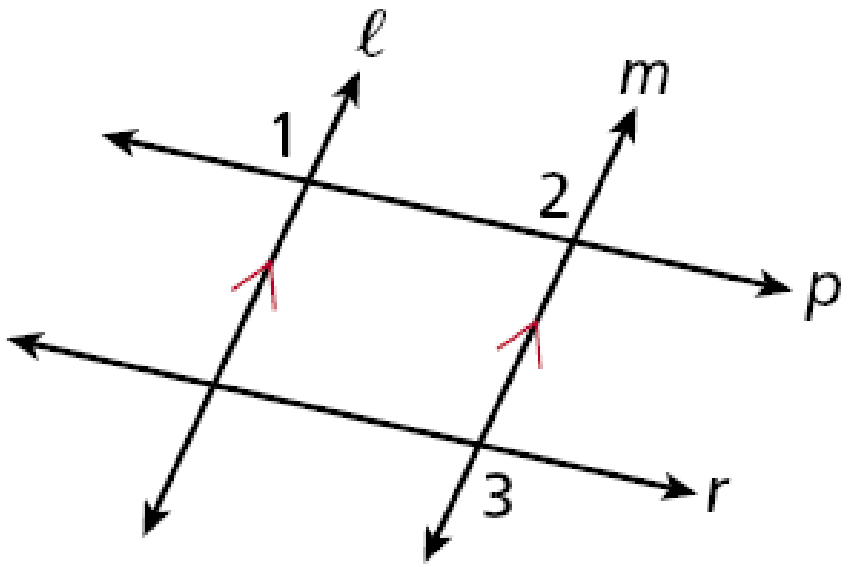
Example 3: Proving Lines Parallel

Given: $p \parallel r$, $\angle 1 \cong \angle 3$
Prove: $\ell \parallel m$



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Example 3 Continued

Statements	Reasons
1. $p \parallel r$	**1.** Given
2. $\angle 3 \cong \angle 2$	**2.** Alt. Ext. $\angle$s Thm.
3. $\angle 1 \cong \angle 3$	**3.** Given
4. $\angle 1 \cong \angle 2$	**4.** Trans. Prop. of $\cong$
5. $\ell \parallel m$	**5.** Conv. of Corr. $\angle$s Post.

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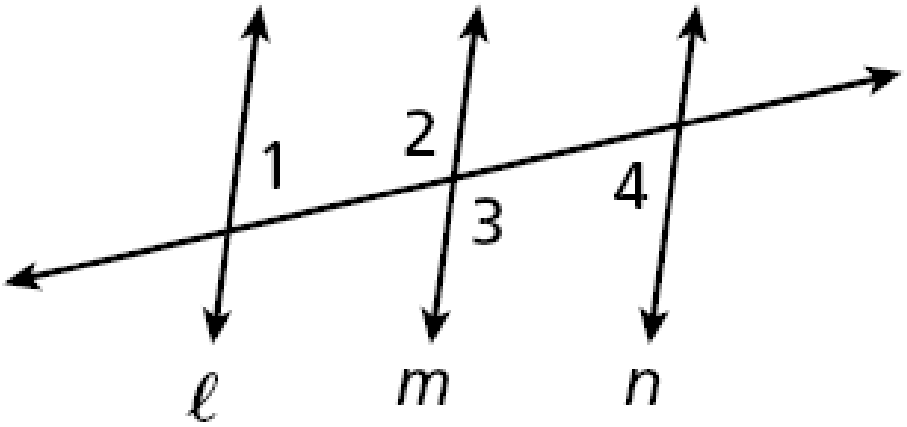
Check It Out! Example 3

Given: $\angle 1 \cong \angle 4$, $\angle 3$ and $\angle 4$ are supplementary.

Prove: $\ell \parallel m$



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Check It Out! Example 3 Continued

Statements	Reasons
1. $\angle 1 \cong \angle 4$	**1.** Given
2. $m\angle 1 = m\angle 4$	**2.** Def. $\cong$ $\angle$s
3. $\angle 3$ and $\angle 4$ are supp.	**3.** Given
4. $m\angle 3 + m\angle 4 = 180°$	**4.** Trans. Prop. of $\cong$
5. $m\angle 3 + m\angle 1 = 180°$	**5.** Substitution
6. $m\angle 2 = m\angle 3$	**6.** Vert.$\angle$s Thm.
7. $m\angle 2 + m\angle 1 = 180°$	**7.** Substitution
8. $\ell \parallel m$	**8.** Conv. of Same-Side Interior $\angle$s Post.

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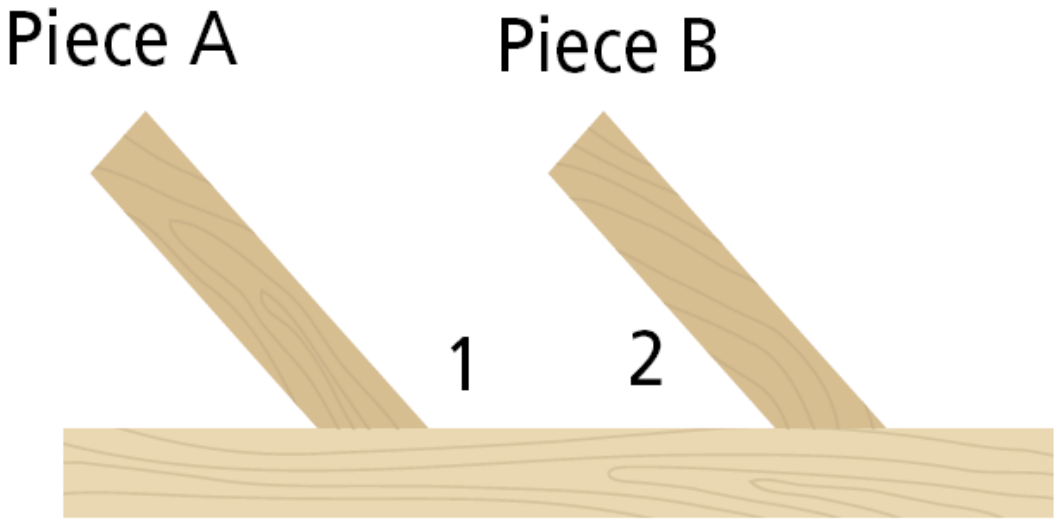
Example 4: Carpentry Application

A carpenter is creating a woodwork pattern and wants two long pieces to be parallel. $m\angle 1 = (8x + 20)°$ and $m\angle 2 = (2x + 10)°$. Find the value of x that shows Piece A and Piece B are parallel.



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Example 4 Continued

A line through the center of the horizontal piece forms a transversal to pieces A and B.

$\angle 1$ and $\angle 2$ are same-side interior angles. If $\angle 1$ and $\angle 2$ are supplementary, then pieces A and B are parallel.

Substitute 15 for x in each expression.

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Example 4 Continued

$m\angle 1 = 8x + 20$

$= 8(15) + 20 = 140$ *Substitute 15 for x.*

$m\angle 2 = 2x + 10$

$= 2(15) + 10 = 40$ *Substitute 15 for x.*

$m\angle 1 + m\angle 2 = 140 + 40$

$= 180$ *∠1 and ∠2 are supplementary.*

The same-side interior angles are supplementary, so pieces A and B are parallel by the Converse of the Same-Side Interior Angles Theorem.

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No Homework Tonight

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