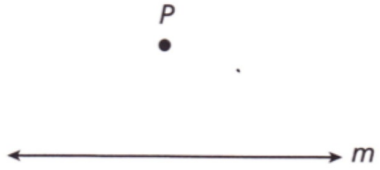
Section 3.3

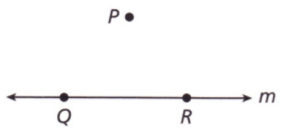
Proving Lines are Parallel

Constructing a line parallel to another line at a point

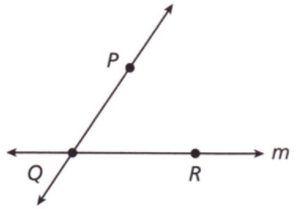
Construct a line parallel to line m that passes through point P. Work directly on the figure below.



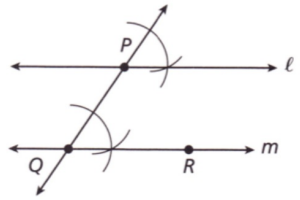
A Choose points Q and R on line



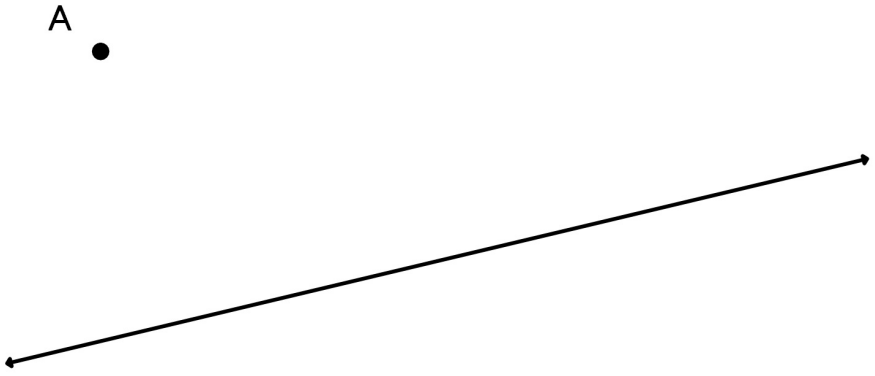
B Use a straightedge to draw $\overleftrightarrow{PQ}$.



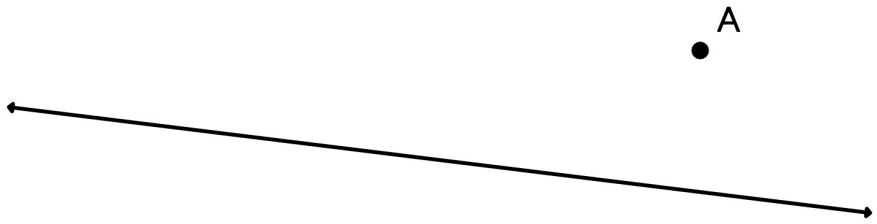
C Copy $\angle PQR$ at point P, as shown. Label line ℓ. Line ℓ is the required line.



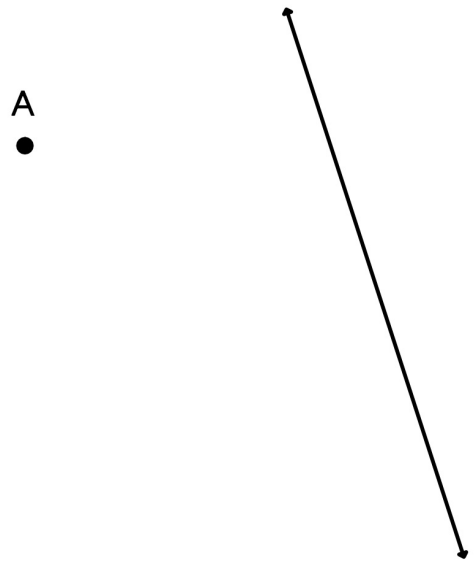
Construct a line parallel to the line that contains point A



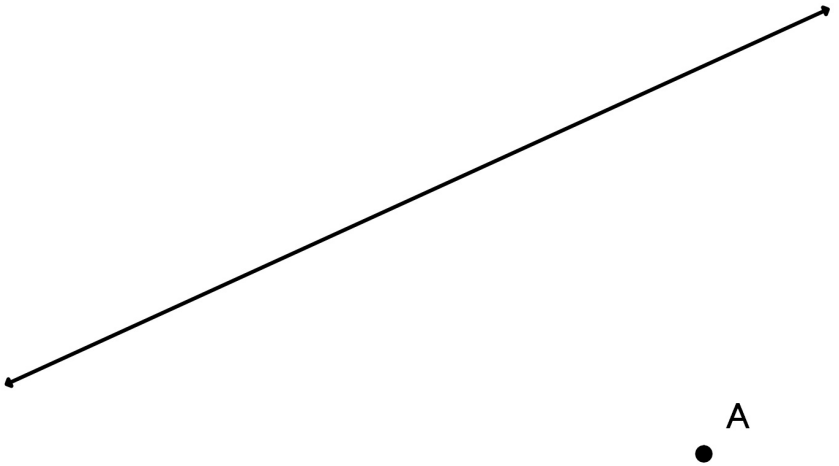
Construct a line parallel to the line that contains point A



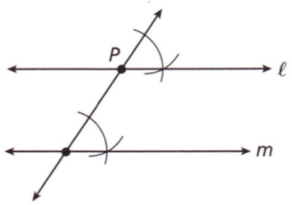
Construct a line parallel to the line that contains point A



Construct a line parallel to the line that contains point A



4. The figure shows a given line m, a given point P, and the construction of a line ℓ that is parallel to line m. Explain why line ℓ is parallel to line m.



REFLECT

1a. Why does it make sense to copy $\angle PQR$ to get a line parallel to line m?

1b. Is it possible to construct a line parallel to a given line m that passes through a point P that is *on* line m? Why or why not?

1c. Write an if-then statement that justifies the method used in the construction of parallel lines.

Below are the main postulates/theorems from yesterday.

Write the converse of each

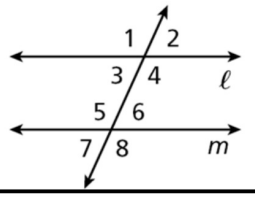
If two parallel lines are cut by a transversal, then the pairs of corresponding angles are congruent.

If two parallel lines are cut by a transversal, then the pairs of alternate interior angles are congruent.

If two parallel lines are cut by a transversal, then the two pairs of same-side interior angles are supplementary.

Use the Converse of the Corresponding Angles Postulate and the given information to show that $\ell \parallel m$.

$\angle 4 \cong \angle 8$

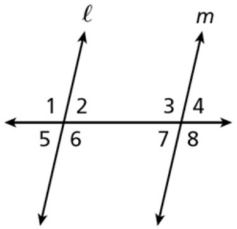


$\angle 4 \cong \angle 8$

$\ell \parallel m$

Use the Converse of the Corresponding Angles Postulate and the given information to show that $\ell \parallel m$.

$m\angle 1 = m\angle 3$

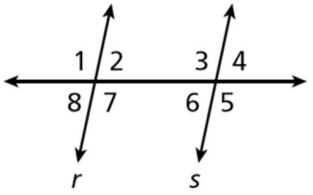


$\angle 1 \cong \angle 3$

$\ell \parallel m$

Use the given information and the theorems you have learned to show that $r \parallel s$.

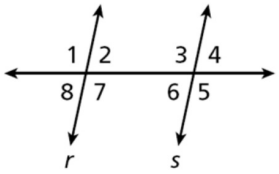
$\angle 4 \cong \angle 8$



$\angle 4 \cong \angle 8$

$r \parallel s$

Refer to the diagram. Use the given information and the theorems you have learned to show that *r* || *s*.

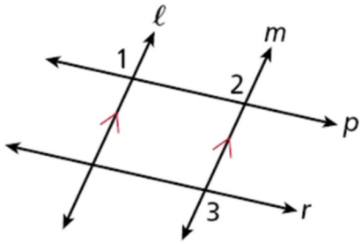


m∠4 = m∠8

∠4 ≅ ∠8 *Congruent angles*

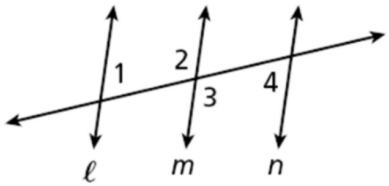
∠4 ≅ ∠8	
r || *s*	

Given: *p* || *r* , ∠1 ≅ ∠3
Prove: ℓ || *m*



Statements	Reasons
1. *p* || *r*	**1.**
2. ∠3 ≅ ∠2	**2.**
3.	**3.** Given
4.	**4.**
5. ℓ || *m*	

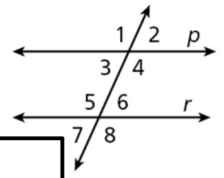
Given: ∠1 ≅ ∠4, ∠3 and ∠4 are supplementary.
Prove: ℓ || *m*



Statements	Reasons
1. ∠1 ≅ ∠4	**1.**
2. m∠1 = m∠4	**2.** Def. ≅ ∠s
3. ∠3 and ∠4 are supp.	**3.** Given
4. m∠3 + m∠4 = 180°	**4.**
5. m∠3 + m∠1 = 180°	**5.**
6. m∠2 = m∠3	**6.**
7. m∠2 + m∠1 = 180°	**7.**
8. ℓ || *m*	

Lesson Quiz: Part I

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



1. ∠4 ≅ ∠5

2. ∠2 ≅ ∠7

3. ∠3 ≅ ∠7

4. ∠3 and ∠5 are supplementary.