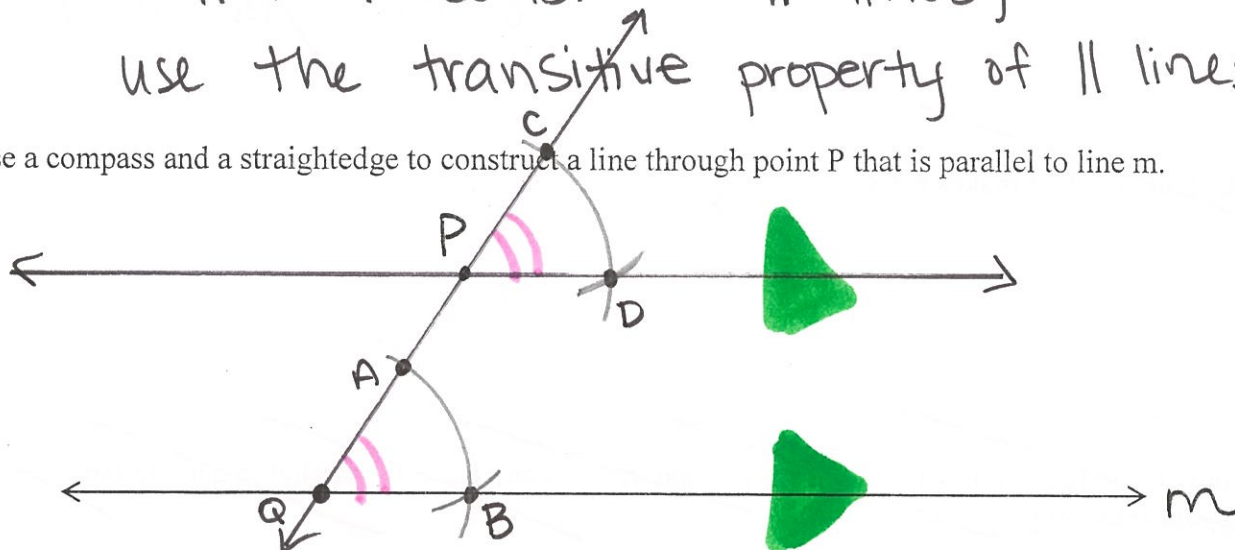


More about Parallel Lines // Constructing Parallel Lines

Lesson Objective

INBAT construct $\parallel$ lines;
use the transitive property of $\parallel$ lines.

Use a compass and a straightedge to construct a line through point P that is parallel to line m.



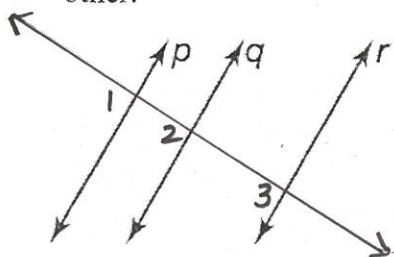
Steps:

- Draw a point and a line** Start by drawing a point (let's call it P) and a line (let's call it m). Choose a point anywhere on line m (let's call it Q) and draw $\overrightarrow{QP}$.
- Draw arcs** Draw an arc with anchor on Q so that the arc crosses $\overrightarrow{QP}$ and line m. Label the intersection points A and B. WITHOUT CHANGING THE COMPASS, draw the same arc with anchor on P. Label the intersection point C.
- Copy the angle** Draw an arc with anchor on point A (or B) through point B (or A). WITHOUT CHANGING THE COMPASS, draw the same arc with anchor on P. Label the intersection point D.
- Draw parallel lines** Draw $\overrightarrow{PD}$. Now $\overrightarrow{PD} \parallel \overrightarrow{QB}$.

Think About It... What theorem or postulate we discussed yesterday lets us conclude that the two lines are parallel?

if corresp. $\angle$ s $\cong \rightarrow \parallel$

Transitive Property of Parallel Lines: If two lines are parallel to the same line, then they are parallel to each other.



PROOF: Given: $p \parallel q$ and $q \parallel r$ Prove: $p \parallel r$

$p \parallel q$

given

$\angle 1 \cong \angle 2$

if $\parallel \rightarrow$ corresp. $\angle$ s $\cong$

$q \parallel r$

$\angle 2 \cong \angle 3$

$\angle 1 \cong \angle 3$

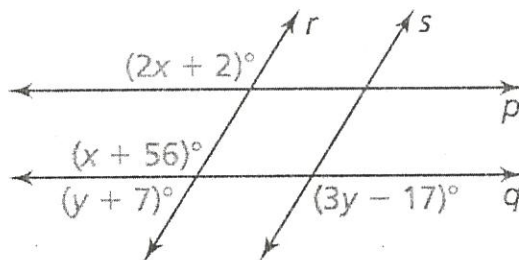
$p \parallel r$

Trans. prop. $\parallel$

Examples:

Use the diagram for #1-3

1. Find the value of x that makes $p \parallel q$



2. Find the value of y that makes $r \parallel s$

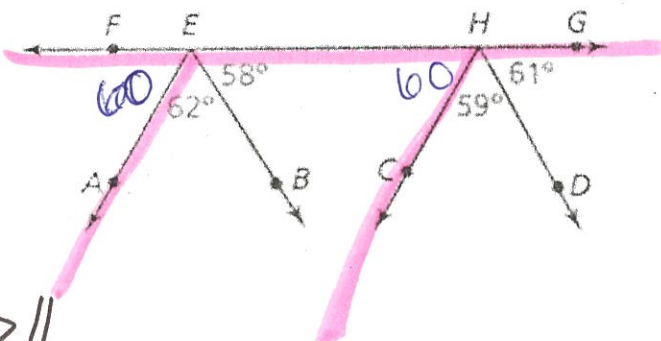
3. Based on your findings from #1 and #2, can r be parallel to s and can p be parallel to q at the same time? Explain your reasoning.

Use the diagram for #4.

4. Which rays are parallel? Explain your reasoning.

$$\overrightarrow{HC} \parallel \overrightarrow{EA}$$

if corresp. $\angle s \cong \rightarrow \parallel$



5. Write a flow chart proof yourself! When your group decides on a final draft, write it on the board.

Given $\angle 1$ and $\angle 3$ are supplementary.

Prove $m \parallel n$

