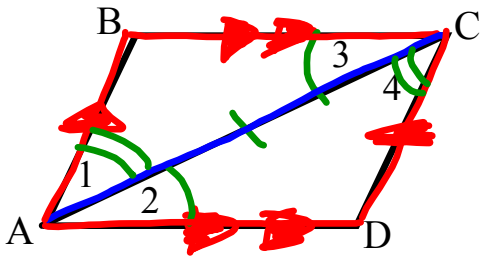
Geometry
Ch. 6 Handout 6.2
Properties of Parallelograms

Theorem 6.1 -- Opposites sides of a parallelogram are congruent.



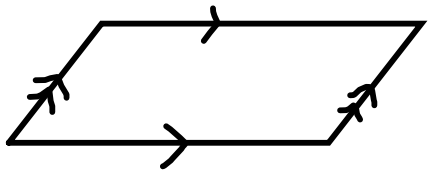
Given: $\square$ ABCD

Prove: $\overline{AB} \cong \overline{DC}, \overline{BC} \cong \overline{DA}$

Statements	Reasons
① $\square$ ABCD	① Given
② $\overline{AB} \parallel \overline{CD}$; $\overline{BC} \parallel \overline{AD}$	② defn of $\square$
③ $\overline{AC} \cong \overline{AC}$	③ Reflexive prop $\cong$
④ $\angle 2 \cong \angle 3$; $\angle 1 \cong \angle 4$	④ If $\parallel$ lines alt int $\angle$s $\cong$
⑤ $\triangle BCA \cong \triangle DAC$	⑤ ASA post
⑥ $\overline{AB} \cong \overline{DC}$, $\overline{BC} \cong \overline{DA}$	⑥ CPCTC

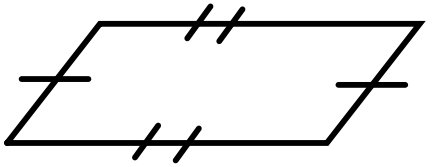
Quad Tree

Defn. of parallelogram (quad. tree)
a quadrilateral with both pairs of opposite sides parallel



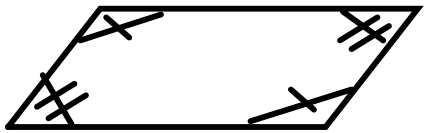
a) both pairs of opposite sides parallell

Theorem 6.1 (quad. tree)
Opposite sides of a parallelogram are congruent.



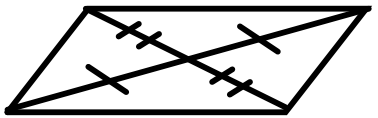
b) both pairs of opposite sides congruent

Theorem 6.2 (quad. tree)
Opposite angles of a parallelogram are congruent (quad. tree)



c) both pairs of opposite angles congruent

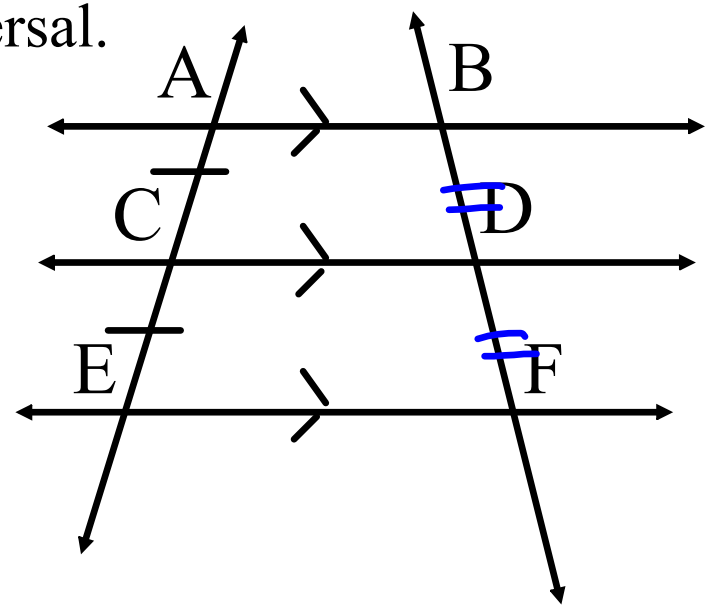
Theorem 6.3
The diagonals of a parallelogram bisect each other.



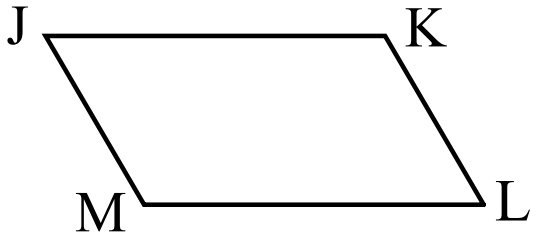
d) diagonals bisect each other

Theorem 6.4

If three (or more) parallel lines cut off congruent segments on one transversal, then they cut off congruent segments on every transversal.

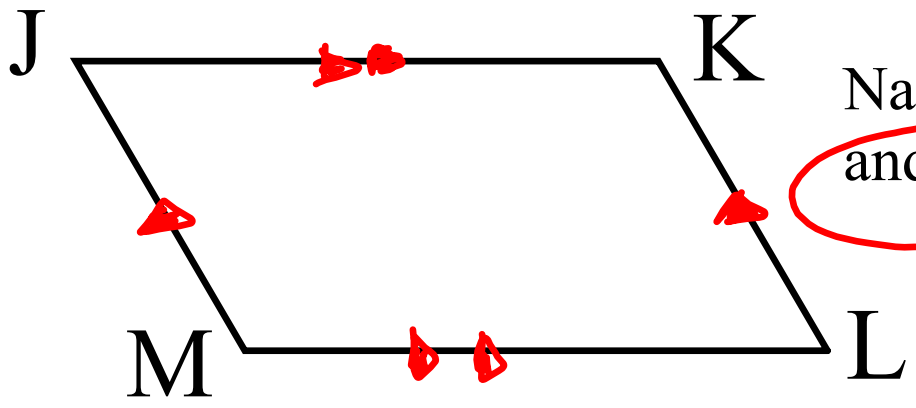


Consecutive angles of a polygon



Name the consecutive angles.

Are ∠J and ∠ L consecutive angles? No; they are opposite ∠'s



Name the angles that are congruent and that are supplementary.

$\angle M \cong \angle K$

$\angle J \cong \angle L$

$\angle M + \angle L$

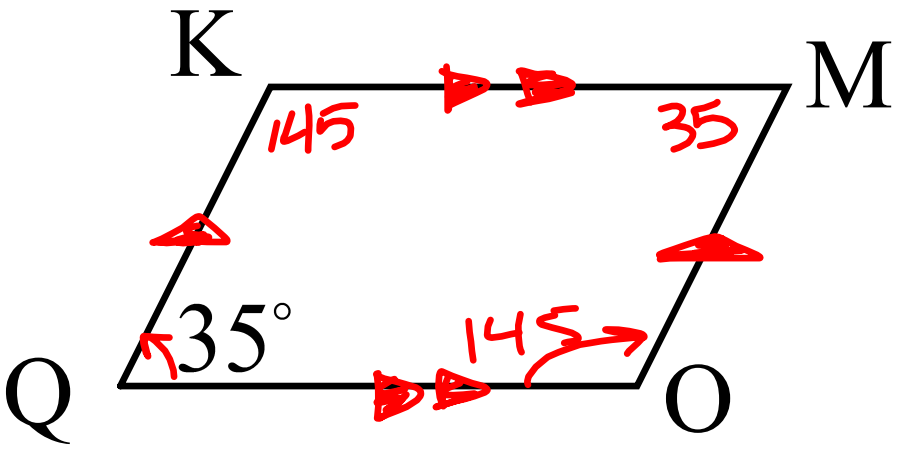
$\angle J + \angle K$

$\angle J + \angle M$

$\angle K + \angle L$

If consecutive angles of a quadrilateral are supplementary, must the quadrilateral be a parallelogram? Explain.

1. Use $\square$ KMOQ to find $m\angle 0$.



180
- 35
145

$m\angle 0 = 145°$

2. Find the value of x $\square$ ABCD. Then find $m\angle A$.

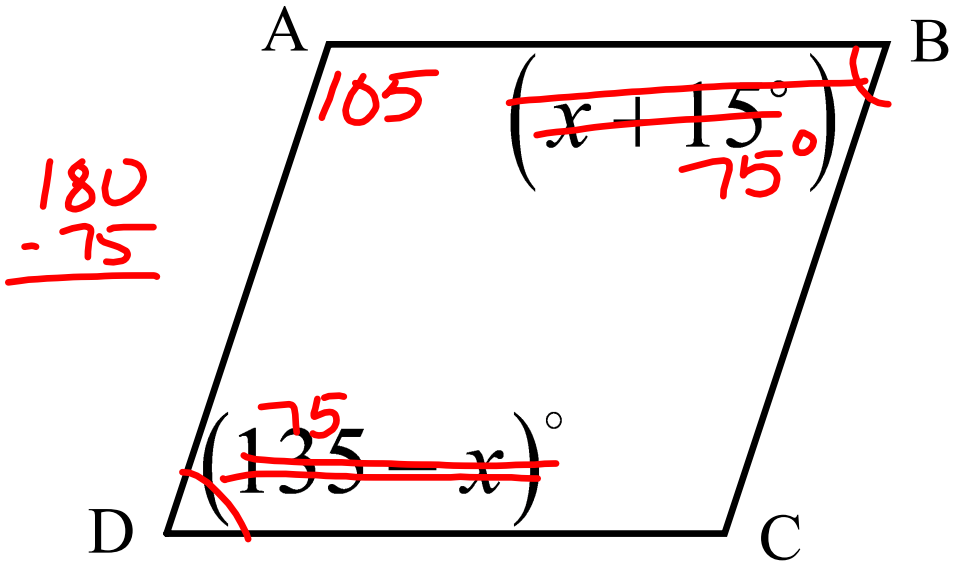
$135 - x = x + 15$
$-15 \quad\quad -15$

$120 - x = x$
$+x \quad +x$

$\frac{120}{2} = \frac{2x}{2}$

$x = 60$

$m\angle A = 105°$

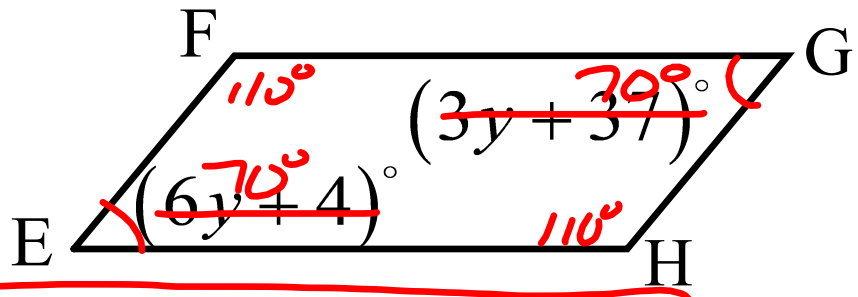


3. Find the value of y in ▱ EFGH. Then find $m\angle E, m\angle G, m\angle F,$ and $m\angle H$.

$6y + 4 = 3y + 37$
$-3y - 4 \quad -3y - 4$

$3y = 33$

$y = 11$



$m\angle E = 70^\circ$ $m\angle G = 70^\circ$
$m\angle F = 110^\circ$ $m\angle H = 110^\circ$

4. Find the values of x and y in □ KLMN.

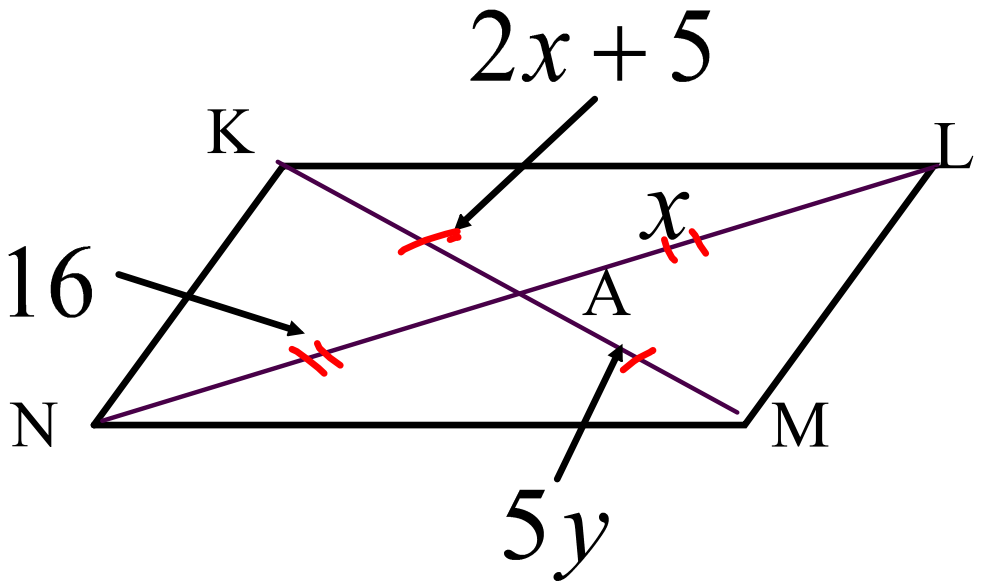
$2x+5 = 5y$
$-5 \quad -5$

$2x = 5y - 5$
$-5y \quad -5y$

$2x - 5y = -5$

$7y - 16 = x$
$-7y \quad -7y$

$x - 7y = -16$



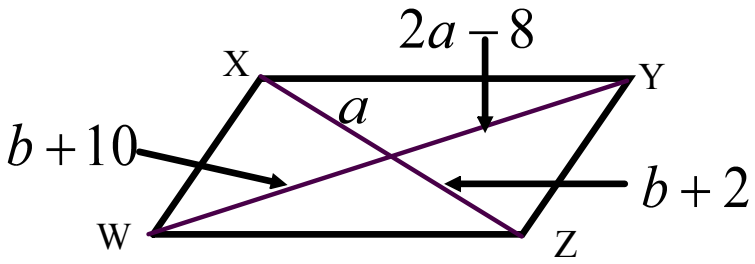
$x = 5$
$y = 3$

$2x - 5y = -5$
$-2(x - 7y = -16) \rightarrow$

$2x - 5y = -5$
$+ \; -2x + 14y = 32$
$9y = 27$
$y = 3$

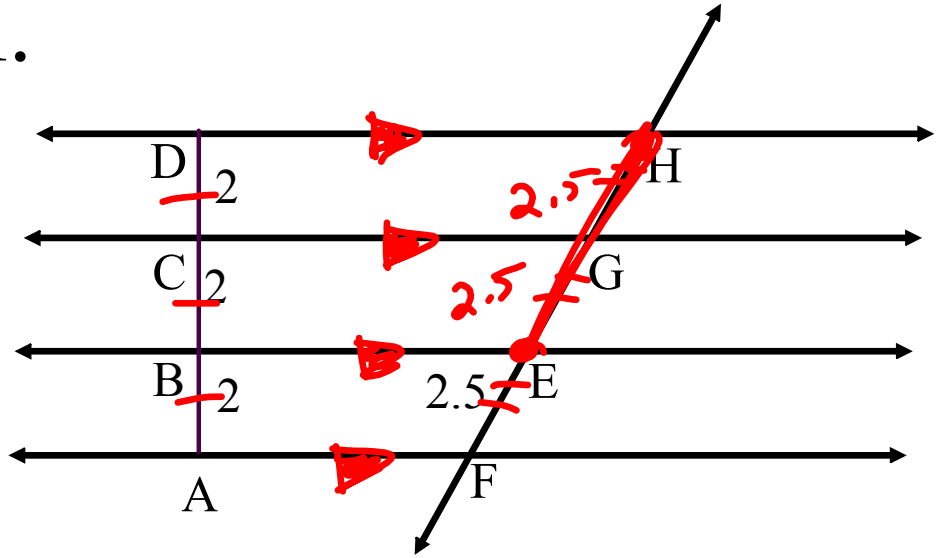
$x - 7y = -16$
$x - 7(3) = -16$
$x - 21 = -16$
$x = 5$

5. Find the values of a and b.



In the figure, $\overleftrightarrow{DH} \parallel \overleftrightarrow{CG} \parallel \overleftrightarrow{BE} \parallel \overleftrightarrow{AF}$, $AB = BC = CD = 2$ and $EF = 2.5$. Find EH.

EH = 5



Assignment:

Day 1: pgs 315-318 (1-33 odds, 37-41 odds, 45)