Wednesday, November 14, 2012

Agenda:

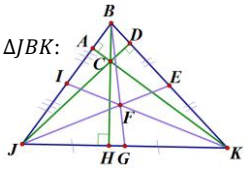
- TISK, No MM
- Lesson 6-1: Prove statements about parallelograms.
- Homework: Ch 6 Packet 1 #1-5

TISK Problems

1) Simplify: $(x + 7)^2$

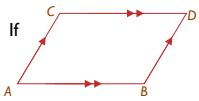
2) Factor: $3x^2 + 4x - 32$

3) Identify the centroid of ΔJBK:



§6.1 Parallelograms

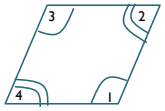
- Definition
  - A quadrilateral is a parallelogram if and only if its opposite sides are parallel.

If 

then *ABCD* is a parallelogram.

Parallel? Great news!

- We have lots of things we know about parallel lines!
  - Alternate Interior Angles Theorem
  - Alternate Exterior Angles Theorem
  - Consecutive Interior Angles Theorem
  - Corresponding Angles Postulate
- So let's look at a parallelogram…
  - What are some of the things we know about it?



$\angle 1$ and $\angle 2$ are supp. (CIA Th.)

The same is true for $\angle 1$ and $\angle 4$ (using the left and right sides and CIA Th.)!

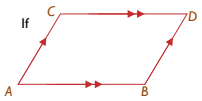
Then $\angle 3$ and $\angle 4$ are also supp,.

$\therefore \angle 2 \cong \angle 4$ ($\cong$ Supp. Th.).

$\therefore \angle 1 \cong \angle 3$ ($\cong$ Supp. Th.).

Theorems

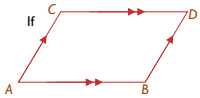
- If a quadrilateral is a parallelogram, then its consecutive angles are supplementary.

If 

then $\angle A$ and $\angle B$ are supplementary
$\angle A$ and $\angle C$ are supplementary
$\angle B$ and $\angle D$ are supplementary
$\angle C$ and $\angle D$ are supplementary

Theorems

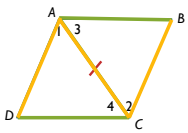
- If a quadrilateral is a parallelogram, then its opposite angles are congruent.

If 

then 

Let's look at what happens if we draw in a diagonal…

- Hey! Two triangles!
  - So all our stuff about triangles works here, too!

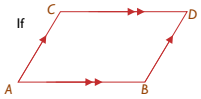


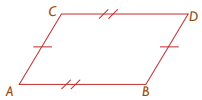
Since it's a parallelogram, we know that $\overline{AB} \parallel \overline{CD}$ and Al $\angle$s are $\cong$,
$\therefore \angle 3 \cong \angle 4$.
Using the same reasoning, we know that $\overline{AD} \parallel \overline{BC}$ $\therefore \angle 1 \cong \angle 2$.
Then, by ASA, $\Delta ADC \cong \Delta CBA$.

$\therefore$, because CPCTC, $\overline{AB} \cong \overline{CD}$ and $\overline{AD} \cong \overline{BC}$.

Theorems

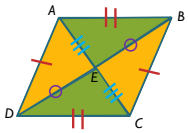
- If a quadrilateral is a parallelogram, then its opposite sides are congruent.

If 

then 

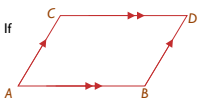
What if we draw in BOTH diagonals?

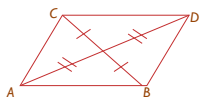
- So we still have $\angle 1 \cong \angle 2$ and $\angle 3 \cong \angle 4$
- Also $\angle 5 \cong \angle 6$ and $\angle 7 \cong \angle 8$
- Then, because it's a parallelogram, we know $\overline{AD} \cong \overline{BC}$ and $\overline{AB} \cong \overline{CD}$
- Then, $\Delta AED \cong \Delta CEB$ (ASA) and $\Delta AEB \cong \Delta CED$ (ASA)
- So, $\overline{AE} \cong \overline{CE}$ and $\overline{BE} \cong \overline{DE}$ both by CPCTC.
- ∴ The diagonals bisect each other.



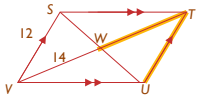
Theorems

- If a quadrilateral is a parallelogram, then its diagonals bisect each other.

If 

then 

Example 1. STUV is a parallelogram. Find the unknown measures.



a) TU

$TU = SV$ If a quad is a ||ogram, ⇒ opp. sides are ≅

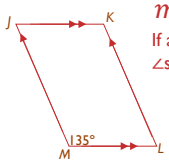
$TU = 12$ Substitution.

b) WT

$WT = WV$ If a quad is a ||ogram, ⇒ diag's bisect each other.

$WT = 14$ Substitution.

Example 2. JKLM is a parallelogram. Find $m\angle L$.



$m\angle M + m\angle L = 180°$

If a quad is a ||ogram, ⇒ Consecutive ∠s are supp.

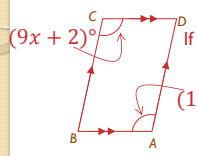
$135° + m\angle L = 180°$

Substitution.

$m\angle L = 45°$

Subtraction.

Example 3. ABCD is a parallelogram. Find the value of x.



$m\angle A = m\angle C$

If a quad is a ||ogram, ⇒ opp. ∠s are ≅

$12x - 34 = 9x + 2$

Substitution.

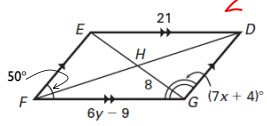
$3x = 36$

$x = 12$

Check Points. DEFG is a parallelogram. Find the indicated measures and explain your reasoning.

$m\angle EDG = 50°$

1. Find $m\angle EDG$



2. Find *EH*.

$EH = 8$

3. Find the value of *y* in the parallelogram above.

$9 = 6y - 9$

$+9 \quad +9$

$30 = 6y$

$y = 5$

4. Find the value of *x* in the parallelogram above.

$50 + 7x + 4 = 180$

$54 + 7x = 180$

$7x = 126$

$x = 18$