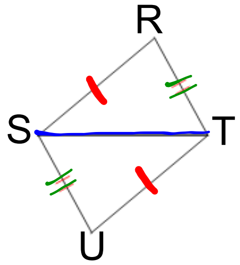
Mind Activator

1. Given $\overline{RS} = \overline{UT}$ and $\overline{RT} \cong \overline{US}$. Prove $\angle R \cong \angle U$.

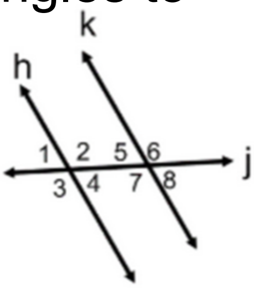


Statement	Reason
$\overline{RS} \cong \overline{UT}$	Given
$\overline{RT} \cong \overline{US}$	Given
$\overline{ST} \cong \overline{TS}$	Reflexive Prop.
$\triangle SRT \cong \triangle TUS$	SSS
$\angle R \cong \angle U$	CPCTC

2. Name 2 congruent and 2 supplementary angles to angle 1 in the image.

$\angle 1 \cong$	
$\angle 5$	corr. $\angle$'s
$\angle 8$	Alt. Int. $\angle$'s

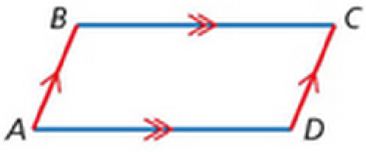
$\angle 1$ supp	
$\angle 6$	same side ext. $\angle$'s
$\angle 2$	Linear Pairs



Official Definition

<u>Parallelogram -</u> A quadrilateral with two pairs of parallel sides.

Parallelogram *ABCD*
▱*ABCD*



$\overline{AB} \parallel \overline{CD}$, $\overline{BC} \parallel \overline{DA}$

parallel

1. ▱ ⟶ opp. sides are ||

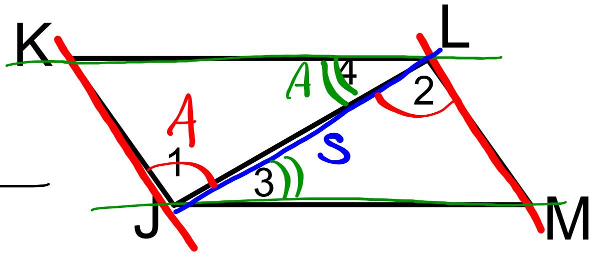
When you see || think:

1. Corr. ∠'s
2. Alt. Int. ∠'s
3. Alt. Ext. ∠'s
4. Same side Int. ∠'s
5. Same Side Ext. ∠'s

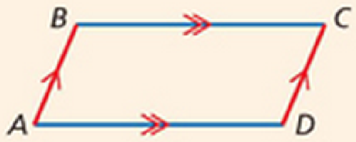
Hint: Before you start make a list of what you already know.

Given: JKLM is a parallelogram

Prove: $\overline{JK}\cong\overline{LM}$, $\overline{KL}\cong\overline{MJ}$

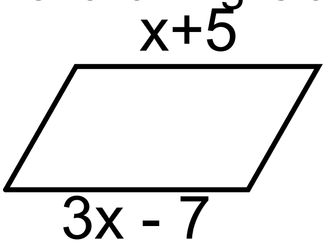


Statement	Reason
JKLM is a ▱	Given
$\overline{KJ} \parallel \overline{LM}$ + $\overline{KL} \parallel \overline{JM}$	Def. of a ▱
$\angle 1 \cong \angle 2$	Alt. Int. ∠'s
$\angle 3 \cong \angle 4$	Alt. Int. ∠'s
$\overline{JL} \cong \overline{LJ}$	Reflexive Prop.
$\triangle JKL \cong \triangle LMJ$	ASA
$\overline{JK} \cong \overline{LM}$ + $\overline{KL} \cong \overline{MJ}$	CPCTC

THEOREM	HYPOTHESIS	CONCLUSION
2. If a quadrilateral is a parallelogram, then its opposite sides are congruent. (▱ → opp. sides ≅)		$\overline{AB} \cong \overline{CD}$ $\overline{BC} \cong \overline{DA}$

Application

The following is a parallelogram, what is the value of x?

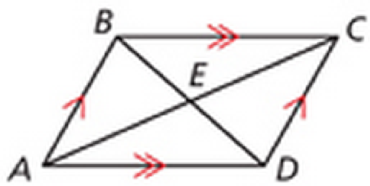


$x+5 = 3x-7$

$5 = 2x - 7$

$12 = 2x$

$x = 6$

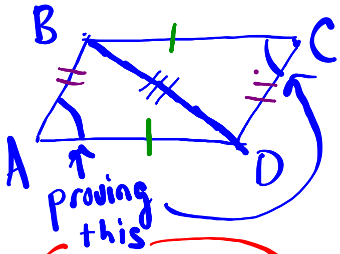


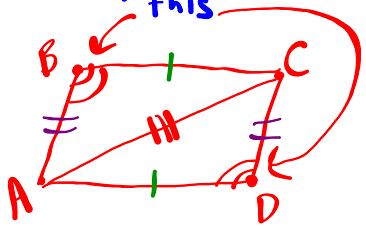
Given: *ABCD* is a parallelogram.

Prove: $\angle BAD \cong \angle DCB$, $\angle ABC \cong \angle CDA$

Proof:

Statement	Reason
ABCD is a ▱	Given
$\overline{BC} \cong \overline{DA}$ + $\overline{BA} \cong \overline{DC}$	▱ → Opp. sides ≅
$\overline{BD} \cong \overline{DB}$	Reflexive Prop.
$\triangle ABD \cong \triangle CDB$	SSS
$\overline{AC} \cong \overline{CA}$	Reflexive Prop.
$\triangle ABC \cong \triangle CDA$	SSS
$\angle BAD \cong \angle DCB$	CPCTC
$\angle ABC \cong \angle CDA$	CPCTC





Theorem:

If a quadrilateral is a parallelogram then its opposite angles are congruent

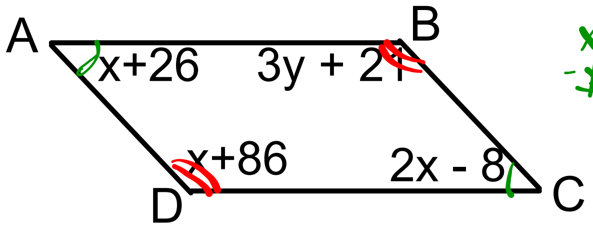
3. ▱ ⟶ opp. ∠'s ≅

Conclusion

$\angle A = \angle C$ and $\angle B = \angle D$

Apply this theorem

ABCD is a parallelogram find the value of x and y.



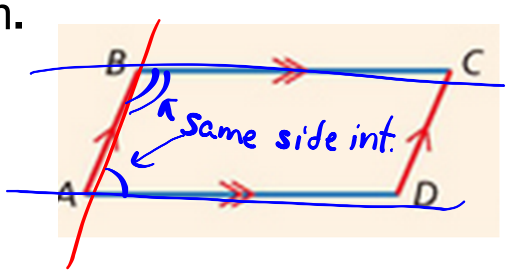
$x + 26 = 2x - 8$
$-x \qquad -x$
$26 = x - 8$
$+8 \qquad +8$
$34 = x$

sub. 34 for x

$3y + 21 = x + 86$
$3y + 21 = (34) + 86$
$3y + 21 = 120$
$3y = 99$
$y = 33$

Prove consecutive angles are supplementary

Given that ABCD is a parallelogram.



Prove: ∠A and ∠B are supplementary.
∠B and ∠C are supplementary.
∠C and ∠D are supplementary.
∠D and ∠A are supplementary.

Statement	Reason
ABCD is a ▱	Given
$\overline{AB} \parallel \overline{DC}$ & $\overline{BC} \parallel \overline{AD}$	Def. of ▱
∠A & ∠B supp.	Same Side Int. ∠'s Thm.
∠B + ∠C Supp.	
∠C + ∠D Supp.	
∠D + ∠A Supp.	

Theorem:

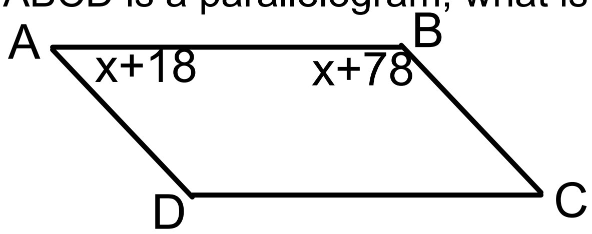
If a quadrilateral is a parallelogram then its consecutive angles are supplementary

4. ▱ → consecutive ∠'s supp.

Application

Unit

ABCD is a parallelogram, what is the measure of angle B?



$x+18+x+78=180$

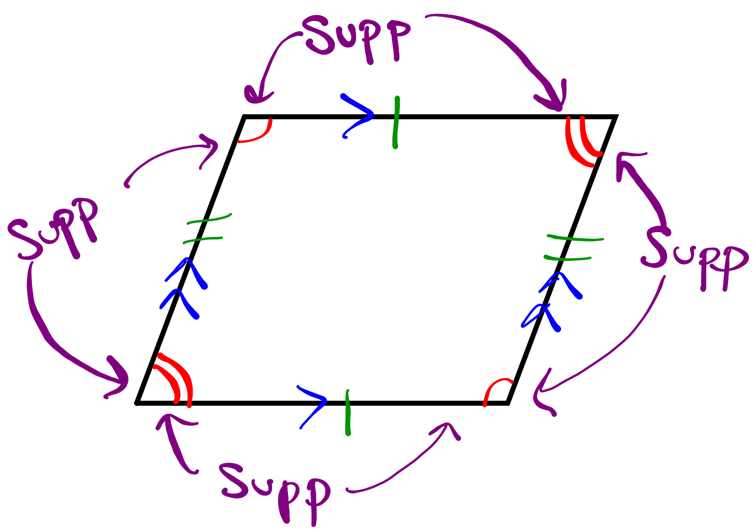
$2x+96=180$

$-96 \quad -96$

$\frac{2x}{2}=\frac{84}{2}$

$x=42$

What have we learned so far?



1. ▱ → opp. sides $\parallel$
2. ▱ → opp sides $\cong$
3. ▱ → opp. $\angle$'s $\cong$
4. ▱ → consecutive $\angle$'s supplementary