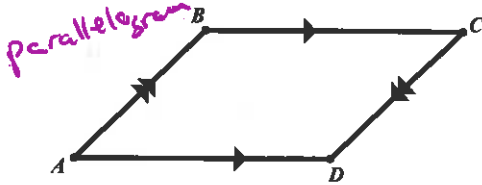


Parallelograms

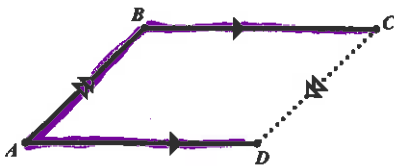
#1

Parallelogram: Quadrilateral with 2 pairs // sides

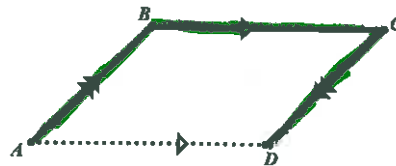


Parallel Sides of a Parallelogram:

1. 2 // lines cut by a transversal make **Same-Side interior Angles** Supplementary.



$$m\angle A + m\angle B = 180$$

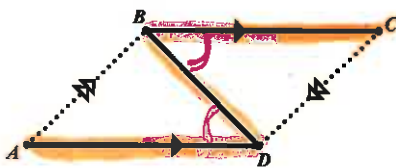


$$m\angle B + m\angle C = 180$$

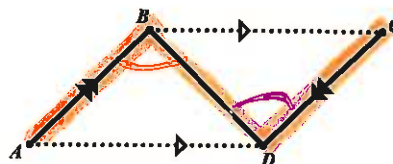
#2

"consecutive \angle 's are supplementary"

2. 2 // lines cut by a transversal make **Alternate Interior Angles** \cong .



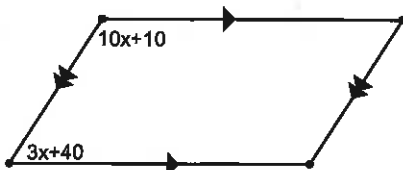
$$\angle ADB \cong \angle CBD$$



$$\angle BAC \cong \angle DCB$$

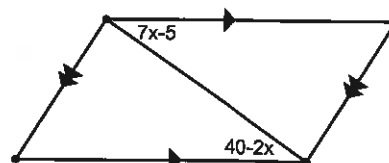
Examples: Solve for x.

1.



$$\begin{aligned} 3x+40 + 10x+10 &= 180 \\ 13x+50 &= 180 \\ 13x &= 130 \\ x &= 10 \end{aligned}$$

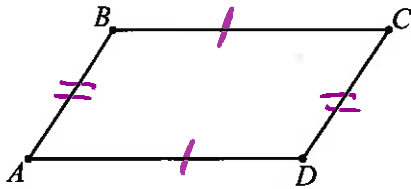
2.



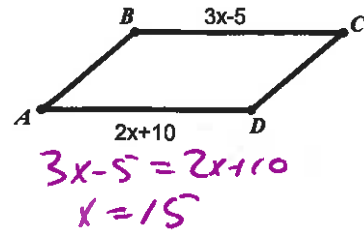
$$\begin{aligned} 7x-5 &= 40-2x \\ 9x &= 45 \\ x &= 5 \end{aligned}$$

Other Parallelogram Properties

#3 Opposite Sides are \cong



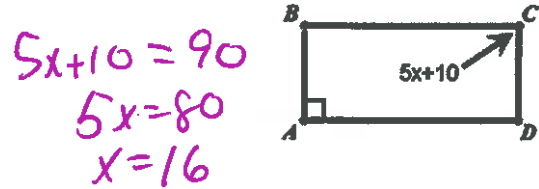
Example:



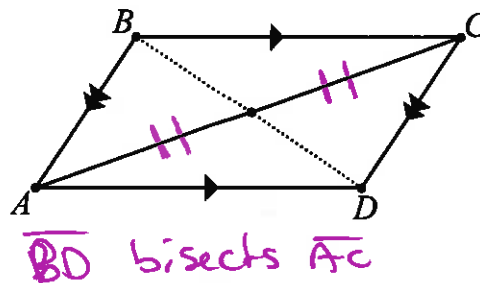
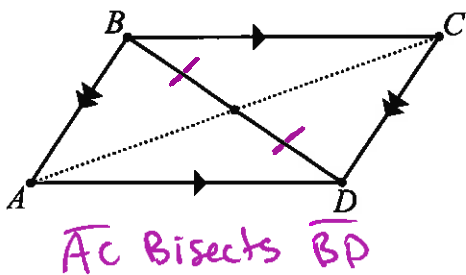
#4 Opposite Angles are \cong



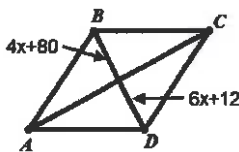
Example:



#5 Diagonals Bisect each other



Example:



$4x+80 = 6x+12$
 $68 = 2x$
 $x = 34$

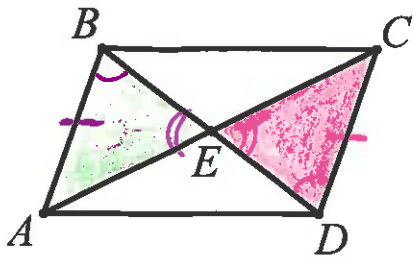
* 5 properties of parallelogram:

- ① opp. Sides \parallel .
- ② Consecutive \angle 's Supp.
- ③ opp sides \cong
- ④ opp. \angle 's \cong
- ⑤ Diags bisect each other.

Proofs Involving Parallelograms:

Given: Parallelogram ABCD

Prove: $\triangle ABE \cong \triangle CDE$



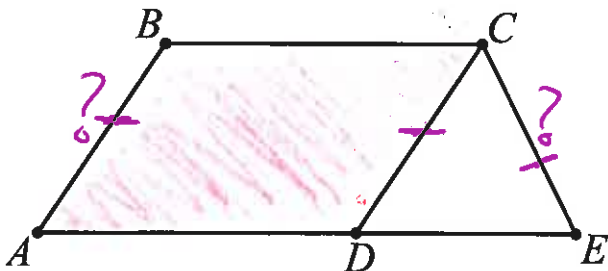
Statements	Reasons
① //ogram ABCD	① Given.
② $\overline{AB} \cong \overline{CD}$	② opp. sides //ogram are \cong .
③ $\overline{AB} \parallel \overline{CD}$	③ Opp. sides //ogram are \parallel .
④ $\angle ABD \cong \angle CDB$	④ \parallel lines cut by a trans. make alt. int \angle 's \cong .
⑤ $\angle BEA \cong \angle DEC$	⑤ Vert. \angle 's are \cong .
⑥ $\triangle ABE \cong \triangle CDE$	⑥ AAS.

Example:

Given: Parallelogram ABCD

$\overline{CD} \cong \overline{CE}$

Prove: $\overline{BA} \cong \overline{CE}$



Statements	Reasons
① //ogram ABCD	① Given
② $\overline{CD} \cong \overline{CE}$	② Given
③ $\overline{AB} \cong \overline{CD}$	② opp sides //ogram are \cong
④ $\overline{BA} \cong \overline{CE}$	③ transitive.

