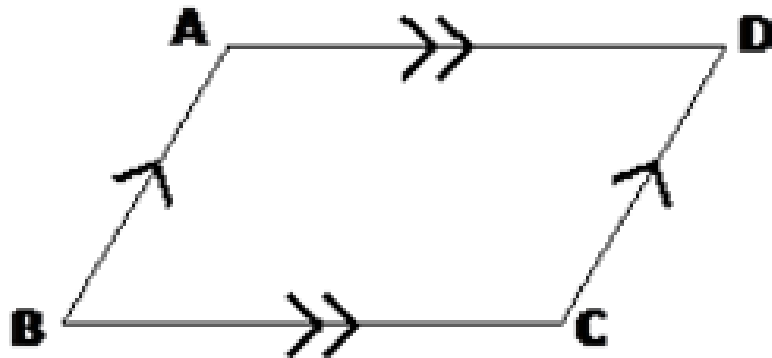


8 - 2

Parallelograms

parallelogram: a quadrilateral
with both pairs of opposite sides
parallel



$\square ABCD$

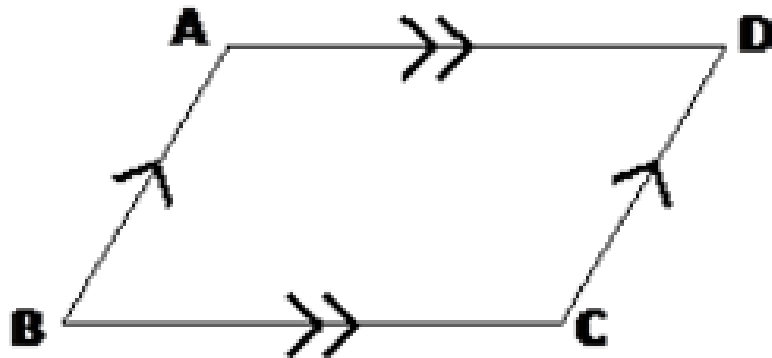
$$\overline{AD} \parallel \overline{BC}$$

$$\overline{AB} \parallel \overline{DC}$$



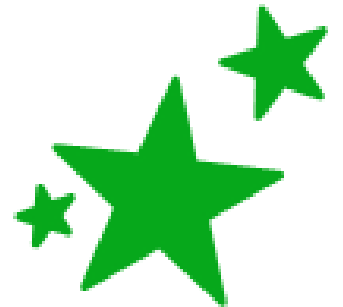
Theorem 8.3 :

Opposite sides are congruent .



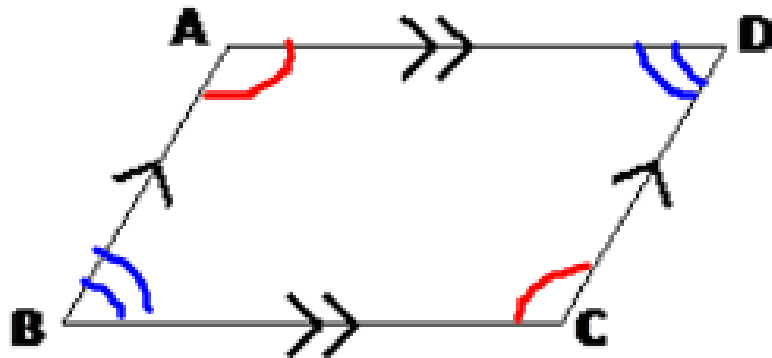
$$\overline{AD} \cong \overline{BC}$$

$$\overline{AB} \cong \overline{DC}$$



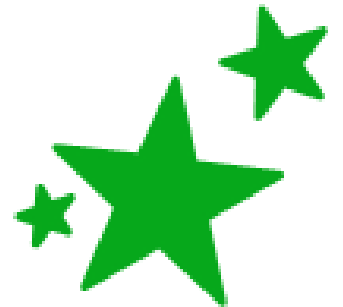
Theorem 8.4 :

Opposite angles are congruent .



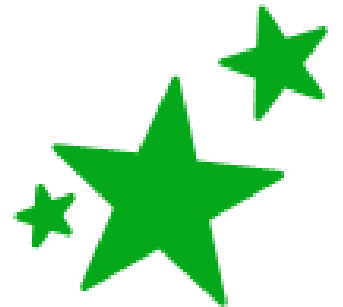
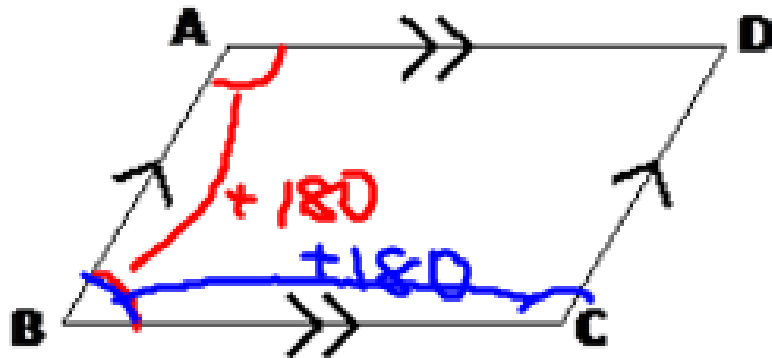
$$\angle A \cong \angle C$$

$$\angle B \cong \angle D$$



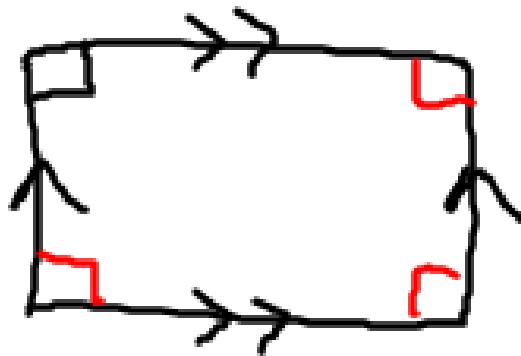
Theorem 8.5 :

Consecutive angles are supplementary .
(+ 180)

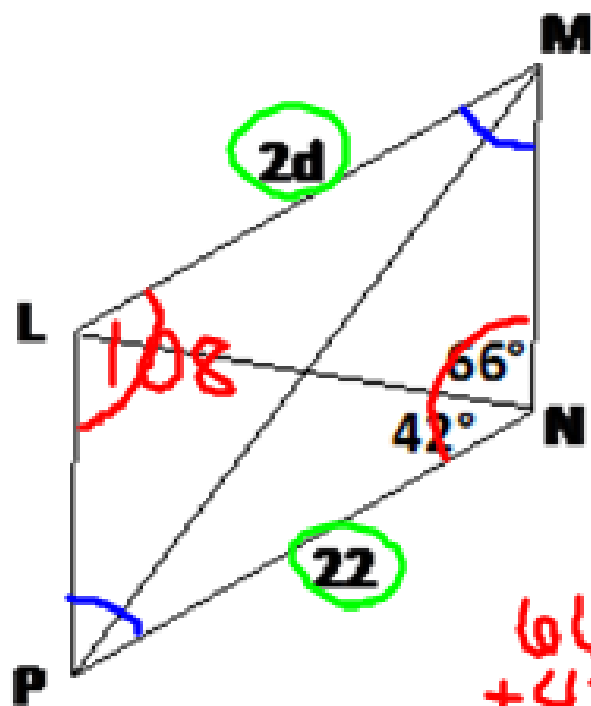


Theorem 8.6 :

If a parallelogram has one right angle,
then it has 4 right angles .



Ex: LMNP is a parallelogram. Find $m\angle \underline{PLM}$, $m\angle \underline{LMN}$, and \underline{d} .



$m\angle PLM = 108^\circ$
 $m\angle LMN = 72^\circ$
 $d = 11$

$$\begin{array}{r} 66 \\ + 42 \\ \hline 108 \end{array}$$

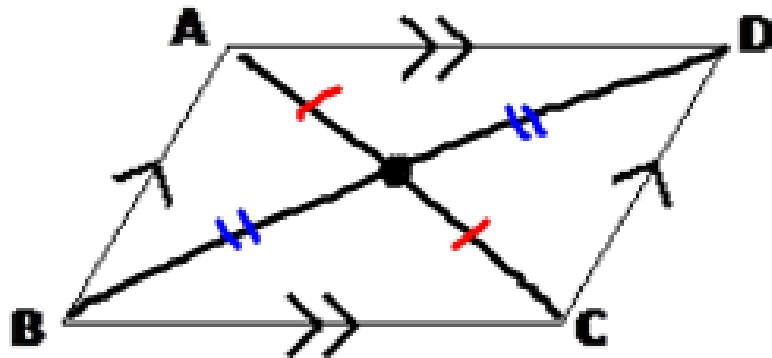
$$\begin{array}{r} 180 \\ - 108 \\ \hline 72 \end{array}$$

$$\begin{array}{r} 2d = 22 \\ \hline 2 \\ \hline d = 11 \end{array}$$

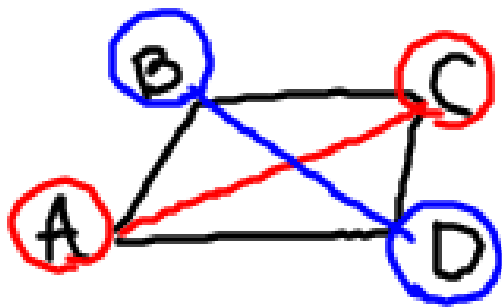


Theorem 8.7 :

Diagonals of a parallelogram
bisect each other .

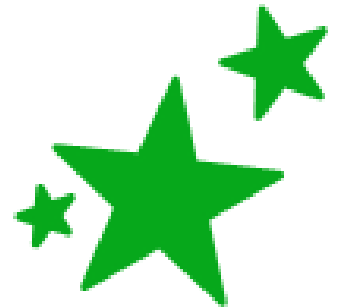


Ex: What are the coordinates of the intersection of the diagonals of parallelogram ABCD with vertices A(2, 5), B(6, 6), C(4, 0), and D(0, -1) ?



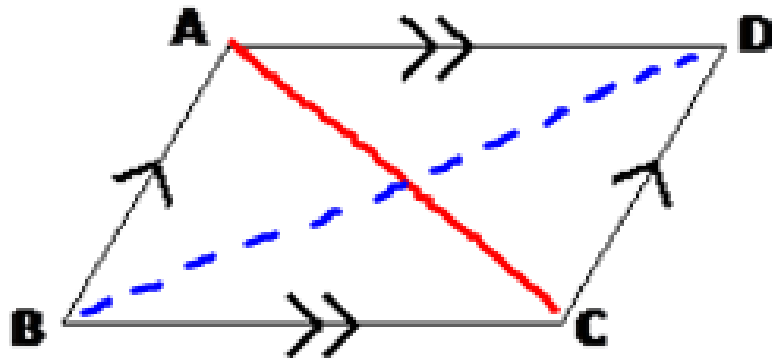
$$\begin{aligned} \text{mid } AC &: \left(\frac{2+4}{2}, \frac{5+0}{2} \right) = \boxed{\left(3, \frac{5}{2} \right)} \\ &\text{or } (3, 2.5) \end{aligned}$$

$$\begin{aligned} \text{mid } BD &= \left(\frac{6+0}{2}, \frac{6+(-1)}{2} \right) \\ &= (3, 2.5) \end{aligned}$$



Theorem 8.7 :

Each diagonal separates the parallelogram into 2 congruent Δ s .



$$\triangle ABC \cong \triangle CDA$$

$$\triangle BAD \cong \triangle DCB$$



Homework:

8 - 2 WS (all)

