

5-1 Parallelograms

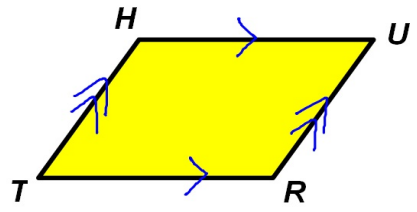
Nov. 4

Defn

A **parallelogram** is a quadrilateral with both pairs of opposite sides parallel.

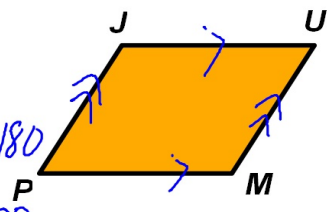
$$\square HURT$$

$$\overline{HU} \parallel \overline{TR}, \overline{TH} \parallel \overline{RU}$$

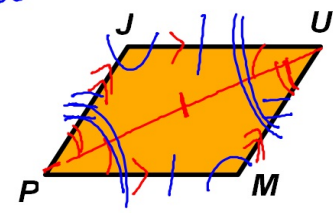


Properties of Parallelograms

- 1 Consecutive angles of a parallelogram are supplementary.
 $m\angle J + m\angle U = 180, m\angle M + m\angle P = 180$
 $m\angle U + m\angle M = 180, m\angle P + m\angle J = 180$

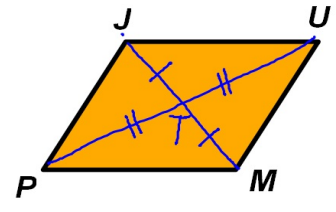


- 2 Opposite sides of a parallelogram are congruent.
 $\overline{JU} \cong \overline{PM}$
 $\overline{JP} \cong \overline{UM}$



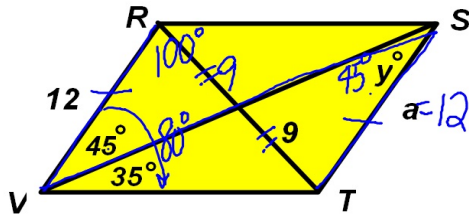
- 3 Opposite angles of a parallelogram are congruent.
 $\angle J \cong \angle M$
 $\angle JUM \cong \angle JPM$

- 4 Diagonals of a parallelogram bisect each other.
 $\overline{JT} \cong \overline{TM}$
 $\overline{TP} \cong \overline{TU}$



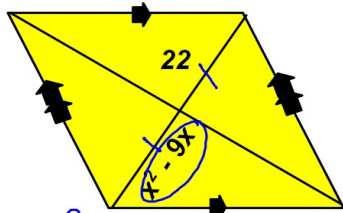
Ex. 1

Parallelogram
RSTV



find $a = 12$
 $RT = 18$
 $m\angle VRS = 100$
 $y = 45$

Ex. 2



find x

$$x^2 - 9x = 22$$

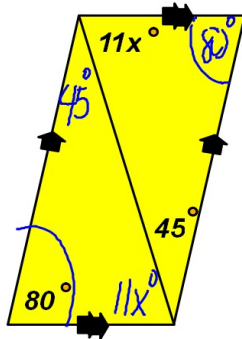
$$x^2 - 9x - 22 = 0$$

$$(x - 11)(x + 2) = 0$$

$$x = 11 \text{ or } -2$$

$$\begin{array}{l} x^2 - 9x \\ 11^2 - 9(11) \\ 121 - 99 = 22 \end{array} \left\{ \begin{array}{l} (-2)^2 - 9(-2) \\ 4 + 18 \\ 22 \end{array} \right.$$

Ex. 3



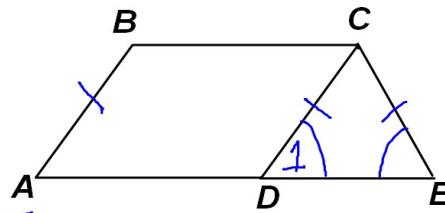
find x

$$11x + 125 = 180$$

$$11x = 55$$

$$x = 5$$

Ex. 4 Given: $\square ABCD$, $\angle 1 \cong \angle E$
Prove: $\overline{AB} \cong \overline{CE}$



① $\square ABCD$,
 $\angle 1 \cong \angle E$

② $\overline{CD} \cong \overline{CE}$

③ $\overline{CD} \cong \overline{BA}$

④ $\overline{CE} \cong \overline{BA}$

① Given

② In Δ , $\cong \angle$ s opp \cong sides.

③ opp sides \cong in a \square

④ Transitive