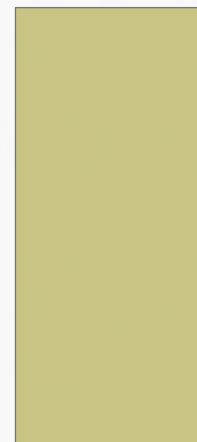


GEOMETRY UNIT 6

PROPERTIES OF PARALLELOGRAMS



WARM-UP

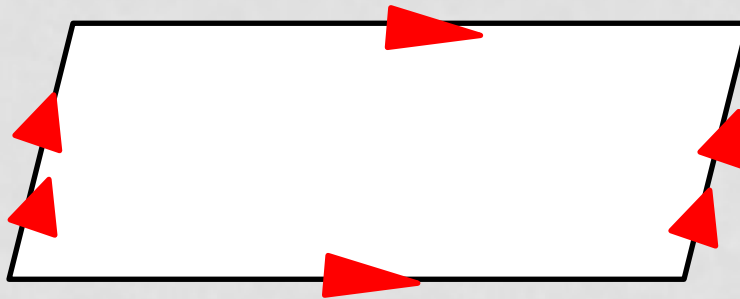
- What's a Quadrilateral?
 - 4 Sides
 - 4 Angles
 - Examples:
 - Squares
 - Rectangle
 - Trapezoid
 - Rhombus
 - **Parallelogram**

PROPERTIES OF PARALLELOGRAMS

- **Content Objective**: Students will be able to identify and use the properties of parallelograms to solve for variables.
- **Language Objective**: Students will be able to write equations using the properties of parallelograms, using them to solve for variables.

ABOUT PARALLELOGRAMS

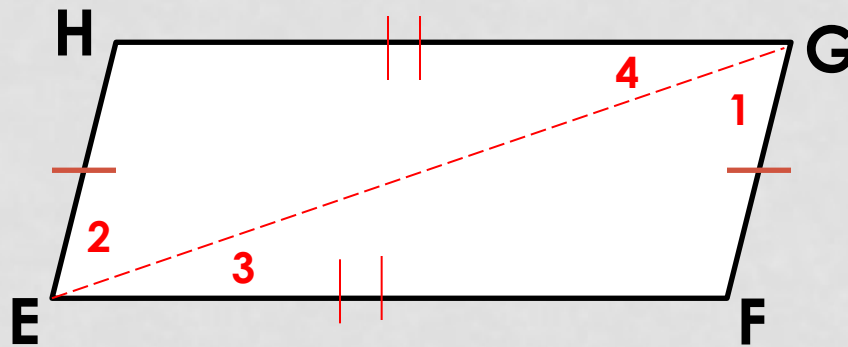
- A **Parallelogram** (\square) is a quadrilateral with both pairs of opposite sides parallel.



The following theorems state some common properties of parallelograms...

THEOREM 5-1

- **Theorem 5-1**: Opposite sides of a parallelogram are congruent.



Plan for Proof:

- You will have to draw a line \overline{EG} to form triangles with corresponding sides \overline{EF} and \overline{HG} , \overline{FG} and \overline{EH} , which will be congruent by CPCTC.
- Use the pairs of alt. int. \angle 's $\angle 1$ and $\angle 2$, $\angle 3$ and $\angle 4$ to prove that the triangles congruent by ASA.

THEOREM 5-2

- **Theorem 5-2:** Opposite angles of a parallelogram are congruent.

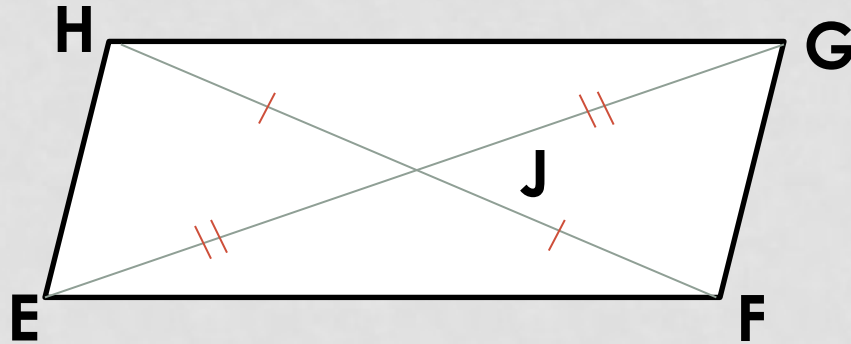


- **Added Information:** The consecutive angles (angles that are next to each other in the diagram) are Supplementary.

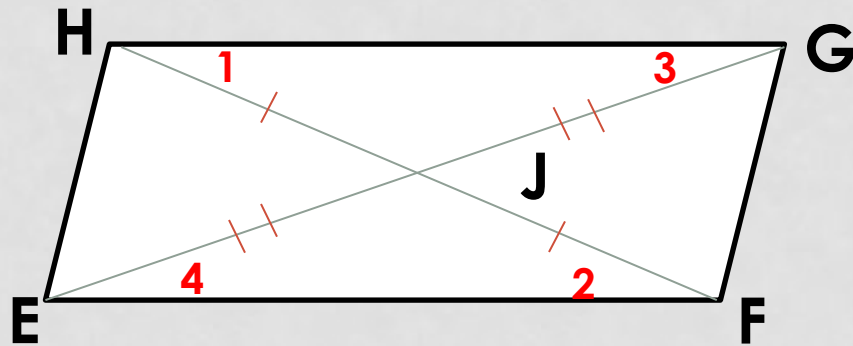
No Proofs for these

THEOREM 5-3

- **Theorem 5-3:** Diagonals of a parallelogram bisect each other.
- **Added Vocab:** A **Diagonal** is a line that connects each angle in a quadrilateral to the angle Across from it.



THEOREM 5-3 CONT.



Plan for Proof:

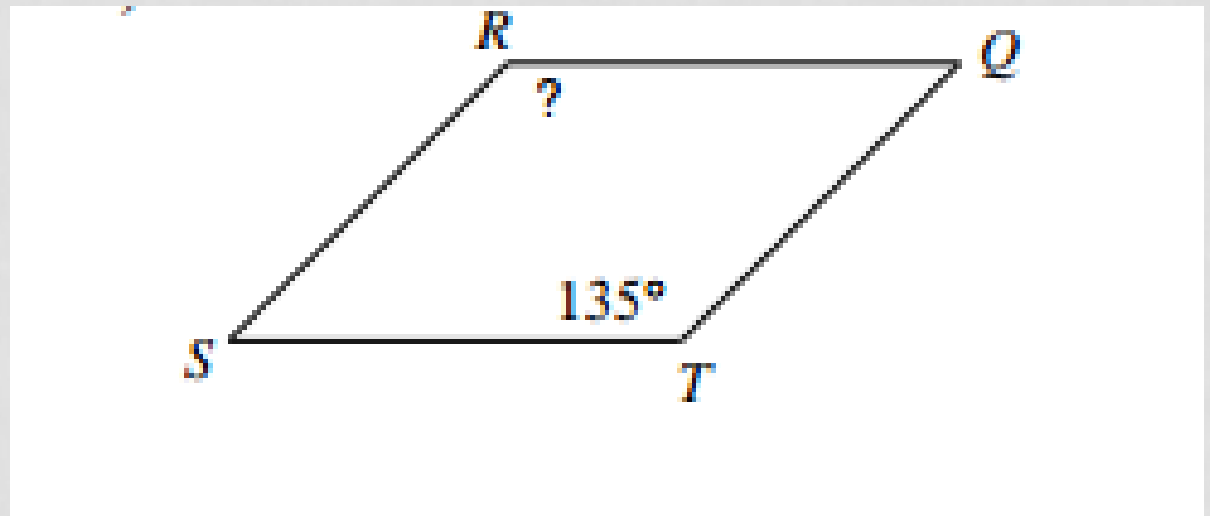
- You can prove that $\overline{EJ} \cong \overline{GJ}$ and $\overline{FJ} \cong \overline{HJ}$ by using CPCTC.
- Since $\overline{EF} \cong \overline{HG}$ from theorem 5-1, you can show that $\triangle EJF \cong \triangle GJH$ by ASA.

PRACTICE WITH THE PROPERTIES

- Using the properties given by the previous theorems, find the values in the given parallelograms.

Answer:

$$? = 135^\circ$$

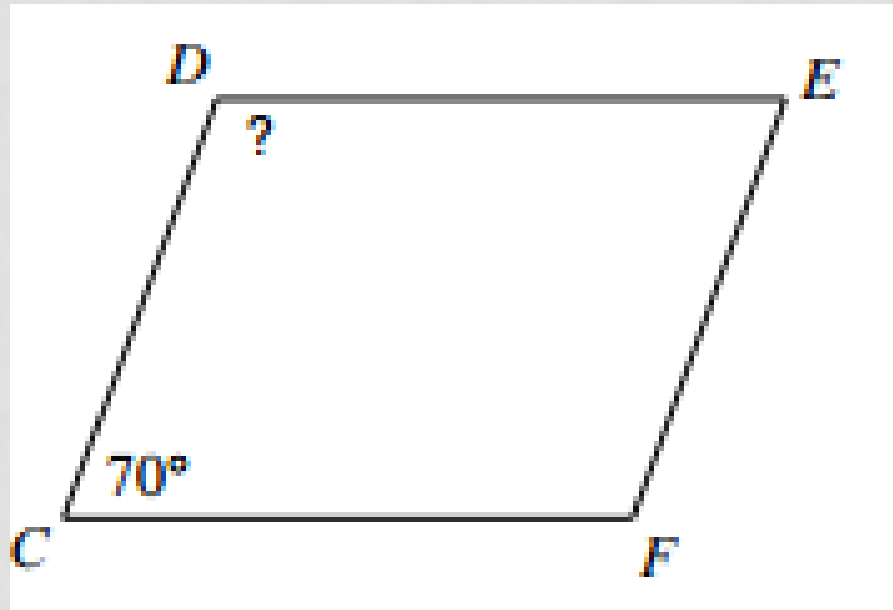


PRACTICE WITH THE PROPERTIES

- Using the properties given by the previous theorems, find the values in the given parallelograms.

Answer:

$$? = 110$$

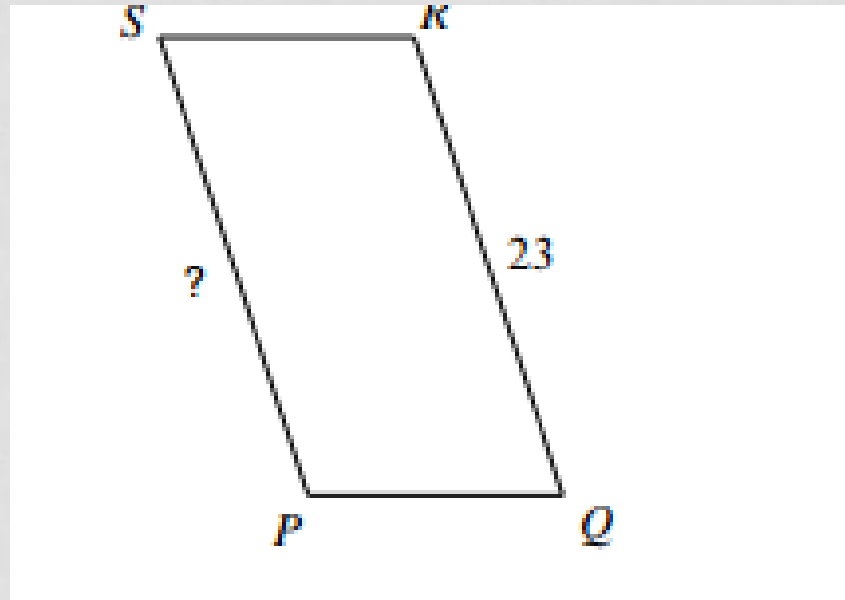


PRACTICE WITH THE PROPERTIES

- Using the properties given by the previous theorems, find the values in the given parallelograms.

Answer:

$$? = 23$$



PRACTICE WITH THE PROPERTIES

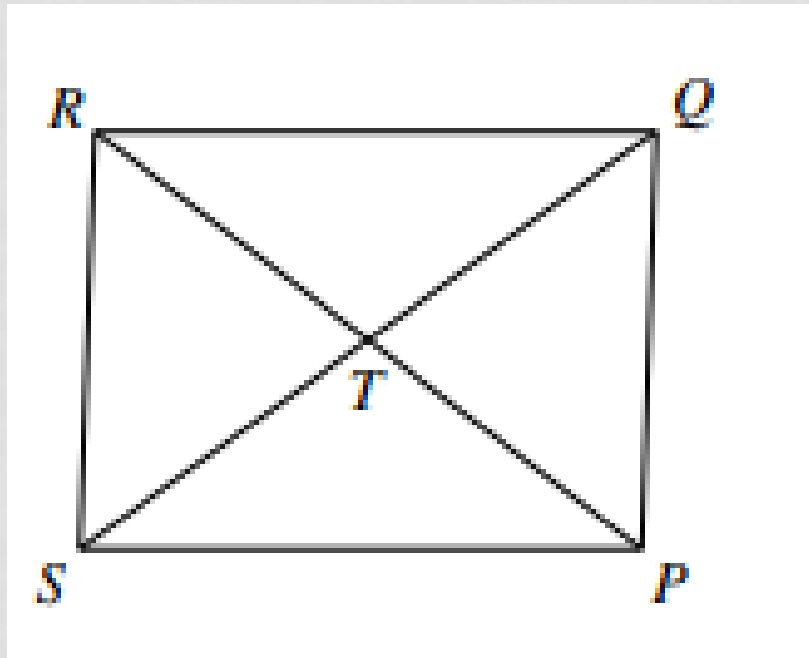
- Using the properties given by the previous theorems, find the values in the given parallelograms.

$$RT = 19$$

Find RP

Answer:

$$RP = 38$$



PRACTICE WITH THE PROPERTIES

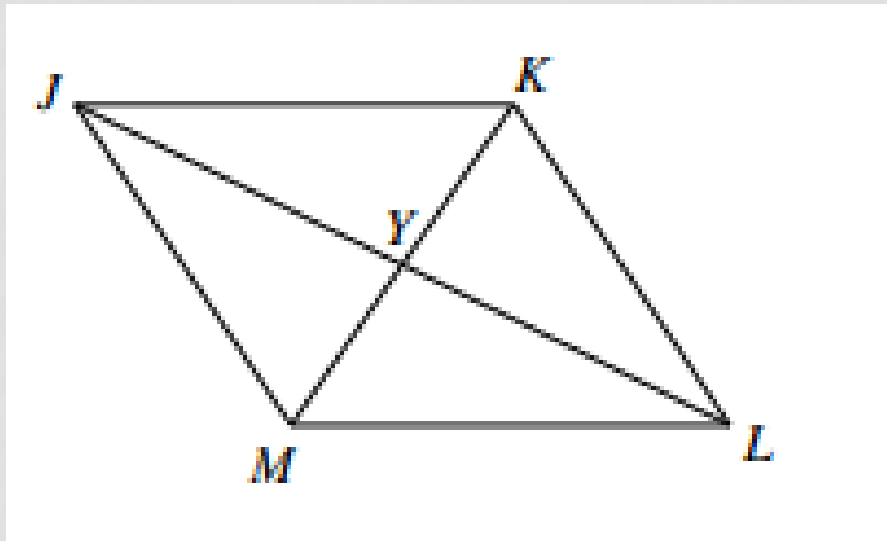
- Using the properties given by the previous theorems, find the values in the given parallelograms.

$$MK = 23$$

Find YM

Answer:

$$YM = 11.5$$



PRACTICE WITH THE PROPERTIES

- Using the properties given by the previous theorems, find the values in the given parallelograms.

Find x .

Answer:

$$80 + 11x - 10 = 180$$

$$70 + 11x = 180$$

$$11x = 110$$

$$x = 10$$

