Geometry Unit 6

Trapezoids

Warm-ups

- **Take out the Special Parallelograms Worksheet from Yesterday.**

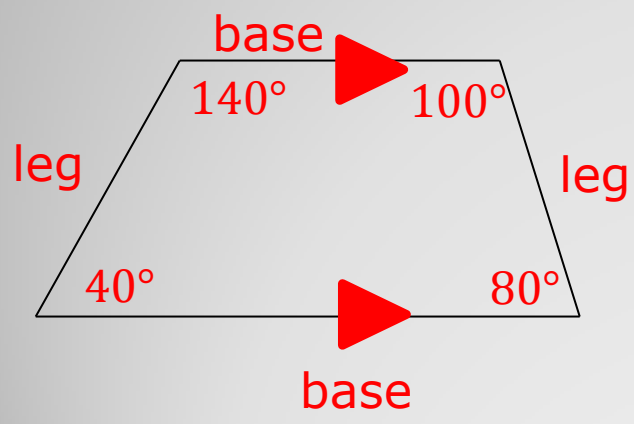
Trapezoids

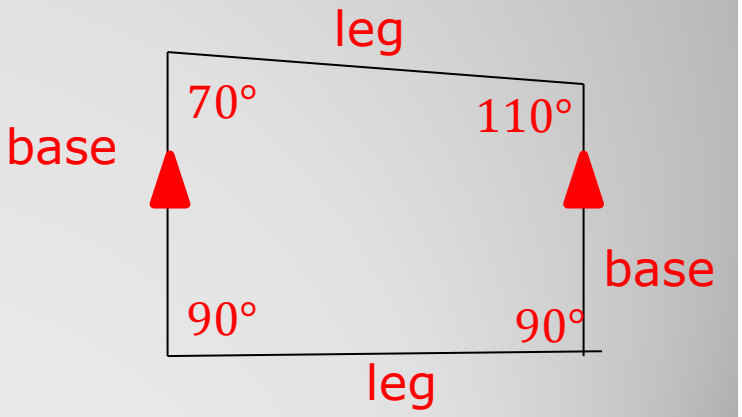
- **Content Objective:** Students will be able to identify the properties of trapezoids.

- **Language Objective:** Students will be able to write and solve equations using the properties of trapezoids.

Trapezoids

- A quadrilateral with exactly one pair of parallel sides is called a **Trapezoid.**
- The parallel sides are called the **bases**.
- The other sides are called the **legs**.

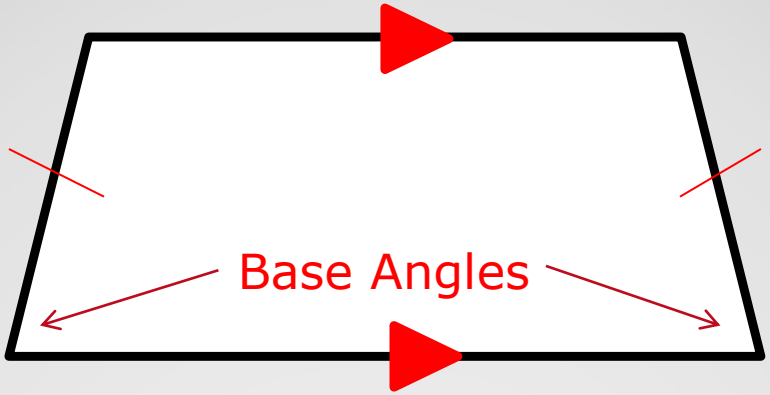




What do you notice about the angles?

Trapezoids

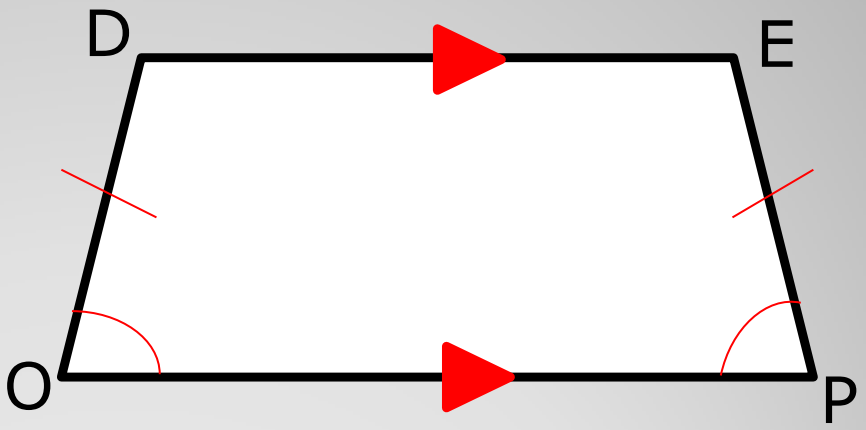
- A trapezoid with congruent legs is known as an **Isosceles Trapezoid**.
- In an Isosceles Trapezoid, the angles across from the congruent legs are known as the base angles



Trapezoid Theorems

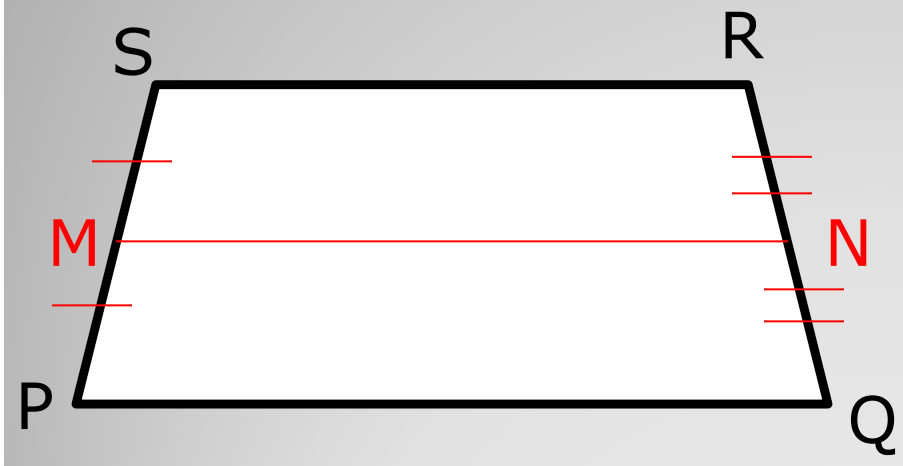
- **<u>Theorem 5-18</u>**: In an Isosceles Trapezoid, the base angles are congruent.

In trapezoid DOPE,
$< DOP \cong < EPO$



Medians

- The **Median** of a trapezoid is the segment that joins the midpoints of the legs.



$\overline{MN}$ is the median of trapezoid PQRS.

Thus,

$$\overline{SM} \cong \overline{MP}$$

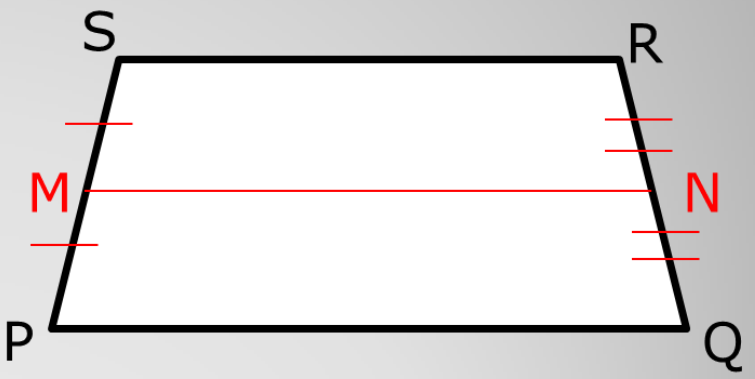
And

$$\overline{RN} \cong \overline{NQ}$$

Median Theorem

- Theorem 5-19: The Median of a trapezoid
  1) Is parallel to the bases;
  2) Has a length equal to the average of the base lengths.

Given: Trapezoid PQRS with median $\overline{MN}$



Prove:

(1) $\overline{MN} \parallel \overline{PQ}$ and $\overline{MN} \parallel \overline{SR}$

(2) $MN = \frac{1}{2}(PQ + SR)$

Medians Practice

- Use the given trapezoid and its median to find the value of x.

Solution:

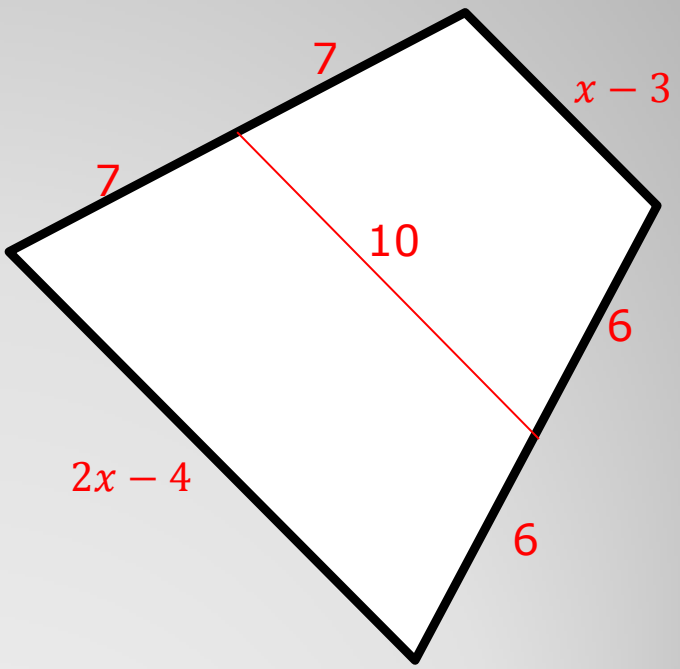
$$10 = \frac{1}{2}[(2x - 4) + (x - 3)]$$

$$20 = (2x - 4) + (x - 3)$$

$$20 = 3x - 7$$

$$27 = 3x$$

$$9 = x$$



Final Check

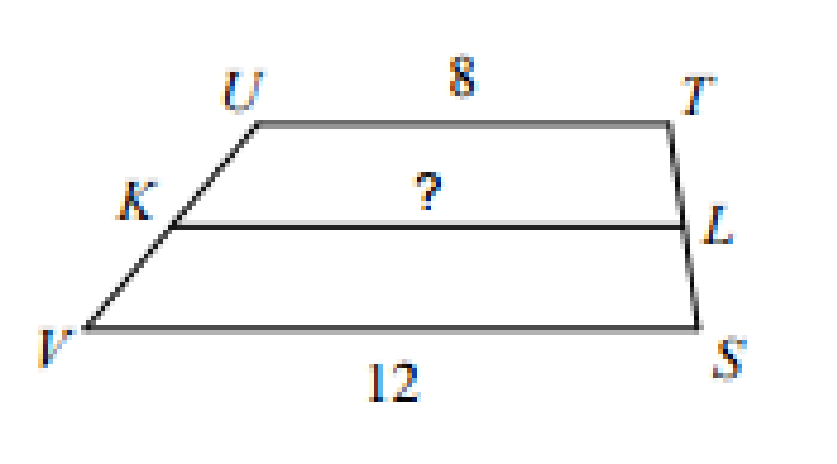
- Write an equation and solve for the missing value(s) in the following trapezoids.

Solution:

$$? = \frac{1}{2}(8 + 12)$$

$$? = \frac{1}{2}(20)$$

$$? = 10$$



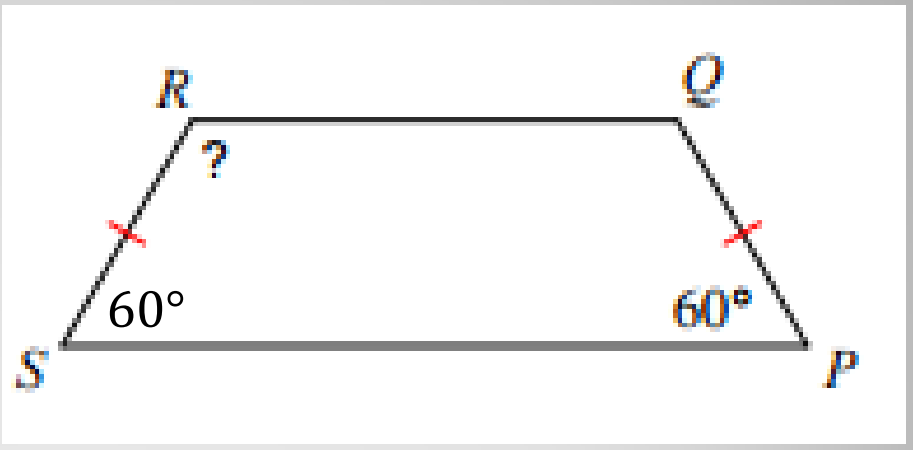
Final Check

- Write an equation and solve for the missing value(s) in the following trapezoids.

Solution:

$? = 180 - 60$

$? = 120$



Final Check

- Write an equation and solve for the missing value(s) in the following trapezoids.

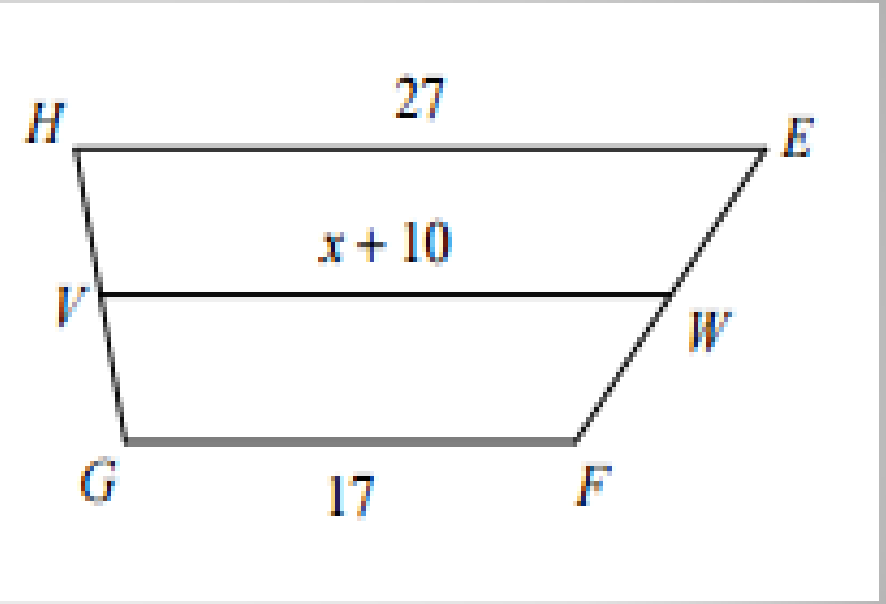
Solution:

$$x + 10 = \frac{1}{2}(27 + 17)$$

$$x + 10 = \frac{1}{2}(44)$$

$$x + 10 = 22$$

$$x = 12$$



Final Check

- Write an equation and solve for the missing value(s) in the following trapezoids.

Solution:

$6x + 39 + 81 = 180$

$6x + 120 = 180$

$6x = 60$

$x = 10$