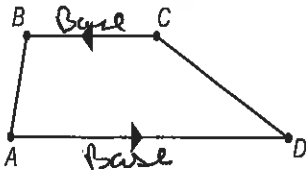


Trapezoids

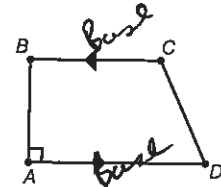
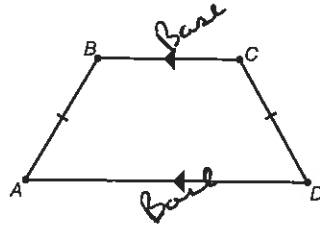
Trapezoid: A quadrilateral with 1 pair of parallel sides.

- The parallel sides are called the "Bases".
- Pairs of angles that share the same base are called "Base Angles".

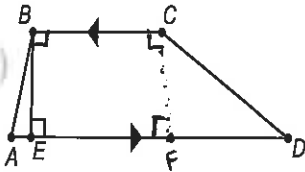
Identify the bases and base angles of each trapezoid:



$\angle A$ and $\angle D$ are base \angle 's
 $\angle B$ and $\angle C$ are base \angle 's. For each picture.

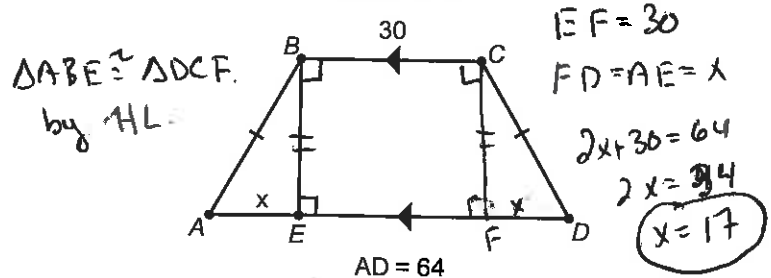


Trapezoid Altitude: A segment drawn from one base, perpendicular to the other base of a trapezoid.
(Typically the Altitude is drawn from vertex to side, but does not have to be.)

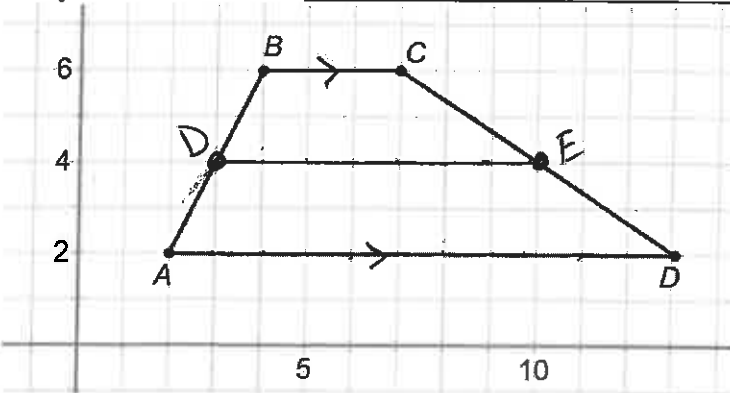


\overline{BE} is the Altitude.
 \overline{CF} is also an Altitude.
note. $BEFC$ is a Rectangle.

Example: Find the value of x .



Trapezoid Median: A segment that connects the midpoints of the non-parallel sides of the trapezoid.



Given Trapezoid ABCD.

1. Draw Median \overline{DE} by connecting the midpoints of the non-parallel sides.

2. How does the slope of Median \overline{DE} compare to the slopes of the bases? What does this imply?

Slope $\overline{DE} = 0$ it is the same slope as the bases.

So, \overline{DE} is parallel to the bases.

3. How does the length of Median \overline{DE} compare to the length of the bases? What does this imply?

$$DE = 7 \quad BC = 3 \quad AD = 11$$

$$DE = \frac{BC + AD}{2}$$

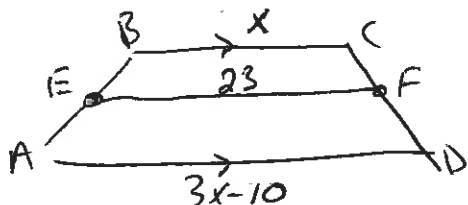
Use your results from questions 2 and 3 to complete each theorem about a **trapezoid median**:

Theorem 1: The Median of a trapezoid is parallel to the bases of the trapezoid.

Theorem 2: The length of the Median of a trapezoid is $\frac{1}{2}$ the sum of the bases.

Example: Trapezoid ABCD with Median EF. $BC = x$, $EF = 23$, $AD = 3x - 10$.

Find the value of x .



$$23 = \frac{1}{2}(x + 3x - 10)$$

$$2(23) = x + 3x - 10$$

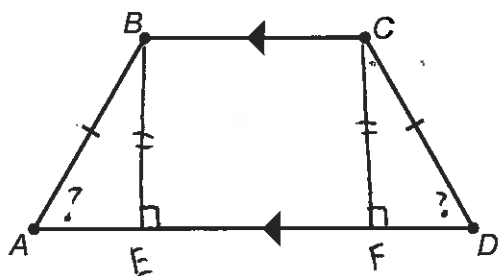
$$46 = 4x - 10$$

$$56 = 4x$$

$$x = 14$$

Isosceles Trapezoid: A trapezoid whose non-parallel sides are congruent.

Theorem 1: The base angles of an isosceles trapezoid are congruent.



Explain why $\angle A \cong \angle D$?

make Altitudes \overline{BE} and \overline{CF} . ~~to~~ thus $\overline{BE} \cong \overline{CF}$.

$\triangle ABE \cong \triangle DCF$ by HL.

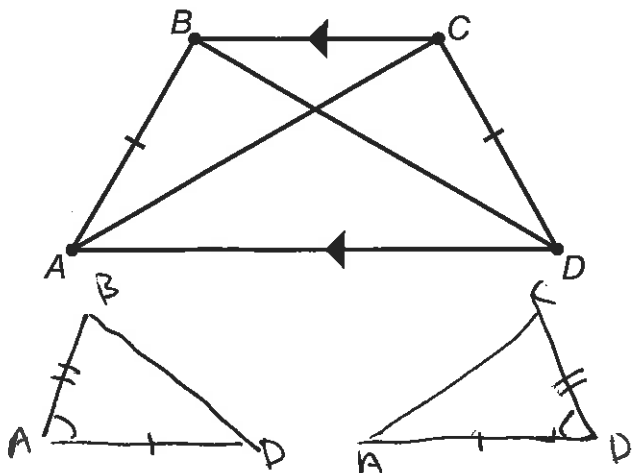
$\angle A \cong \angle D$ by CPCTC.

What is the relationship of $\angle A$ and $\angle B$? How do you know?

$\angle A$ supp $\angle B$ because they are

same side int. to parallel lines \overline{BC} and \overline{AD}

Theorem 2: The diagonals of an isosceles trapezoid are congruent.



Explain why $\overline{AC} \cong \overline{BD}$?

$\triangle ABD \cong \triangle DCA$ by SAS.

$\overline{AC} \cong \overline{BD}$ by CPCTC.