Unit 8 Lesson 8

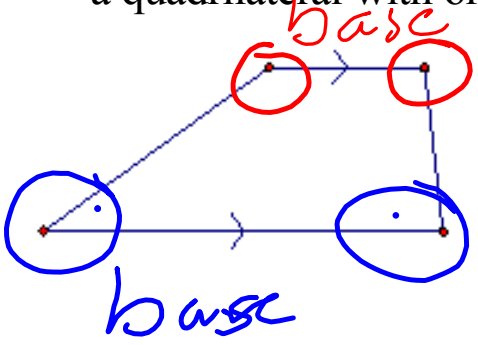
Trapezoids

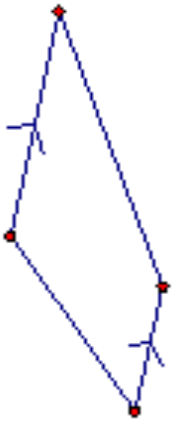
"It is hard to convince a high-school student that he will encounter a lot of problems more difficult than those of algebra and geometry."

-Edgar Watson Howe

Trapezoid

-a quadrilateral with one pair of parallel sides





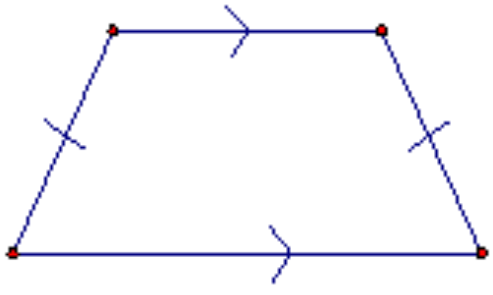
The parallel sides are called the bases

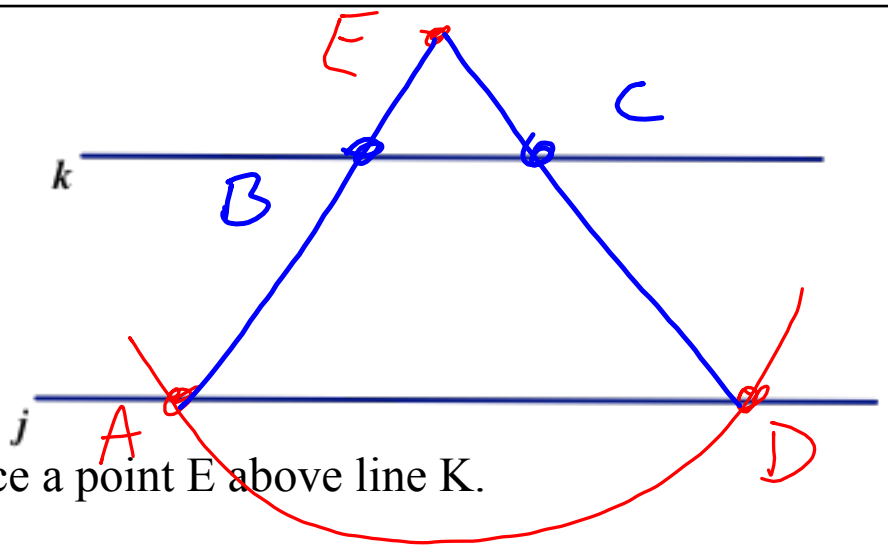
The non-parallel sides are called the legs

There are two pairs of base angles (one pair for each base)

Isosceles Trapezoid

- a trapezoid with congruent legs





1. Place a point E above line K.

2. Place your compass on point E and swing your compass so it intersects line j twice. Label the intersection points A and D.

ED

2. Draw in segment AE and AD.

3. Label the quadrilateral as ABCD.

4. Measure the following:

AB = _____ CD = _____

$m\angle A =$ _____ $m\angle B =$ _____ $m\angle C =$ _____ $m\angle D =$ _____

5. Draw in the diagonals for both isosceles trapezoids and measure:

AC = _____ BD = _____

Q1: What *seems* to be true about isosceles trapezoids?

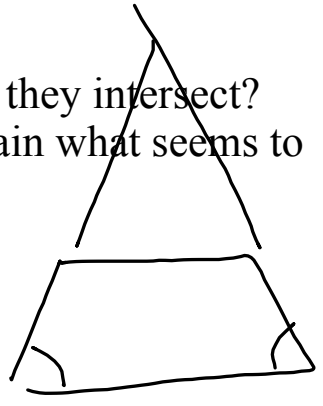
Base $\angle$s are $\cong$

always $\cong$

Q2: What is formed if you extend the legs so they intersect? (in our picture pt E) How does this help explain what seems to be true?

Isos △

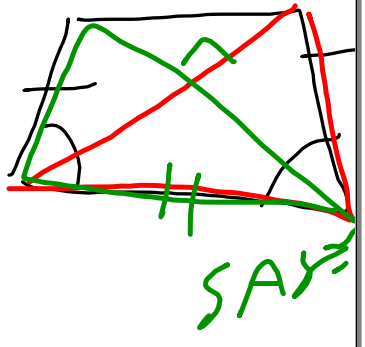
≅ base ∠s



Q2: Do the diagonals bisect each other? Are they perpendicular?

No never

NOT Always



SAS≅

Q3: Do the diagonals bisect the angles?

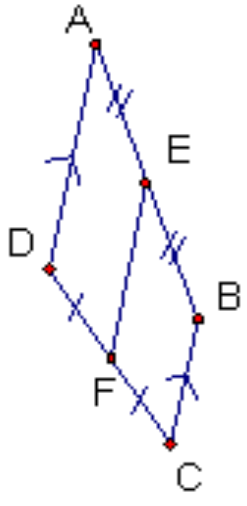
Not Always

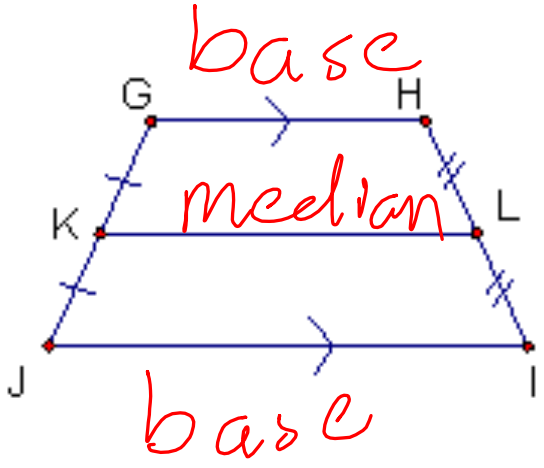
Isosceles Trapezoid Recap:

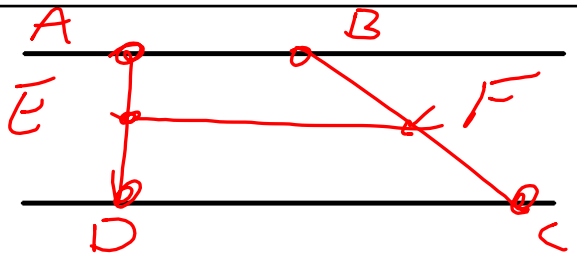
1. A trapezoid with congruent legs (definition)
2. Both pairs of base angles are congruent (theorem 5-18)
3. Diagonals are congruent.

Median of a Trapezoid

- a segment that connecting the midpoints of the legs







1. Use the lines above to create a trapezoid *ABCD*. Place A and B on the top line. Place C and D on the bottom line. (BE SURE TO NOT MAKE A PARALLLELOGRAM).

2. Place the midpoint of the legs of the trapezoid. Label the midpoint of *AD* point *E*. Label the midpoint of *BC* point F.

3. Draw in the median of the trapezoid.

4. Measure the bases, median, and angles of the trapezoid.

AB = _____ $m\angle A$ = _____

CD = _____ $m\angle D$ = _____

EF = _____ $m\angle AEF$ = _____

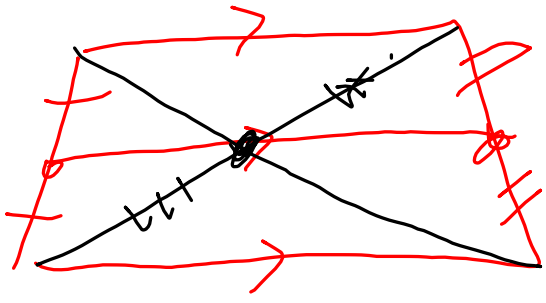
Q1: What seems to be true about the median of the trapezoid? Med is // to bases

$$\frac{AB + CD}{2} = Med$$

5. Draw in the diagonals of both trapezoids.

Q2: Do the diagonals intersect on the median? Will they ever intersect on the median?

No



Theorem 5-19

The median of a trapezoid:

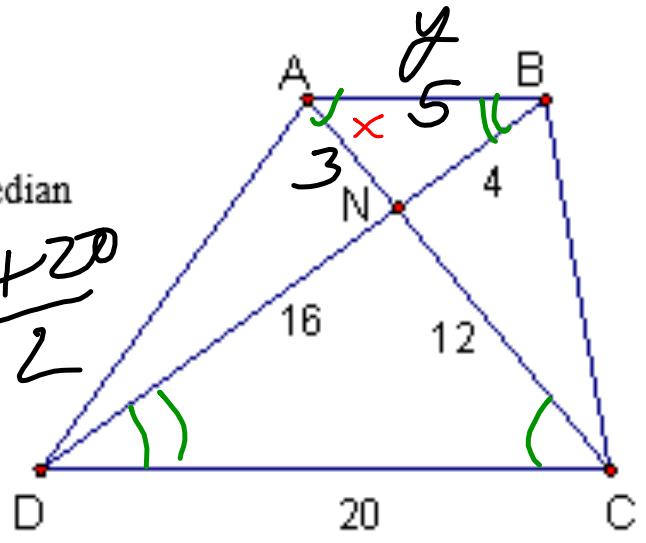
(1) is parallel to both bases

(2) has a length that is equal to the average of the base lengths.

$$med = \frac{b_1 + b_2}{2}$$

In trapezoid $ABCD$, $\overline{AB} \parallel \overline{CD}$.

a) Find the length of AN
b) Find the length of AB
c) Find the length of the median



$\frac{x}{12} = \frac{4}{16}$ $\frac{1}{4}$

$4x = 12$

$x = 3$

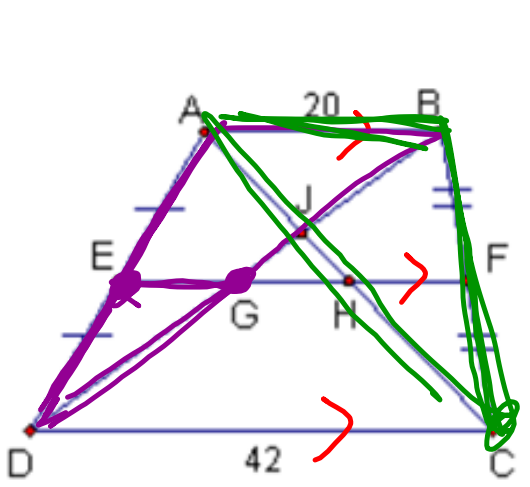
$\frac{1}{5} + 20$

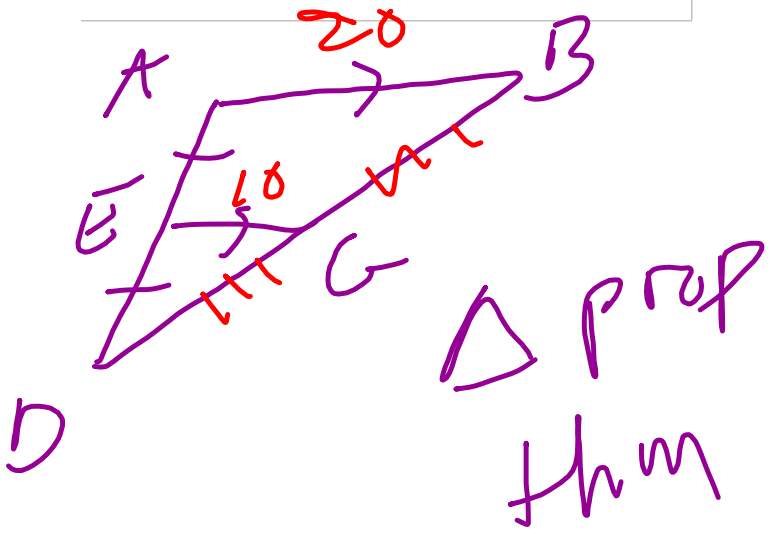
$\frac{}{2}$

$\frac{y}{20} = \frac{1}{4}$

$y = 5$

Example 2: Find EF, EG, GH, and HF.





Example 2:

Are the bases of a trapezoid allowed to be congruent? Explain.

February 08, 2016