

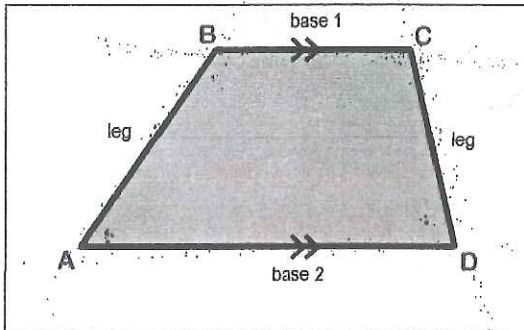
# TRAPEZOIDS NOTES(6-6)

Name \_\_\_\_\_

## TRAPEZOID

Definition: A quadrilateral that has one pair of parallel sides is called a trapezoid.

The sides that are parallel are called bases. The nonparallel sides are called legs.



What is true for the trapezoid because  $BC \parallel AD$ ?

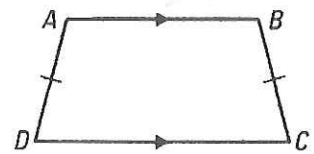
$\angle A + \angle B = 180^\circ$ ; consec. int  $\angle$ s are supp  $\parallel$

$\angle C + \angle D = 180^\circ$

## ISOSCELES TRAPEZOID

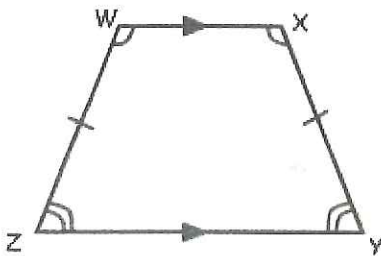
Definition: If the nonparallel sides or legs are congruent, then trapezoid is an Isosceles Trapezoid.

$AD \cong BC$



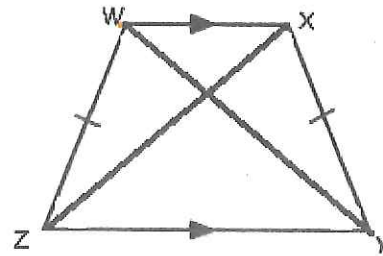
### Properties:

- The base angles of an isosceles trapezoid are congruent.



Geometry:  $\angle Z \cong \angle Y$   
and  $\angle W \cong \angle X$

- Diagonals of an isosceles trapezoid are congruent (but DO NOT bisect each other)



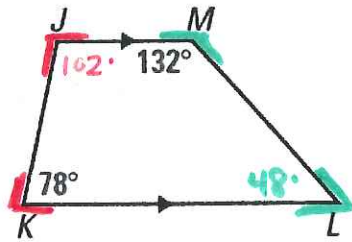
Geometry:  $WY \cong XZ$

**Example Problems**

Find the missing angle measures for each trapezoid.

*trapezoid*

1. Find  $m\angle J$  and  $m\angle L$

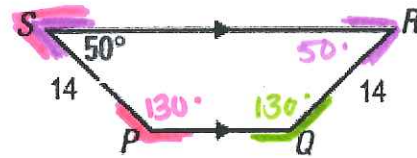


$\angle J + \angle K = 180^\circ$   
 $\angle J = 102^\circ$   
 Consecutive interior  $\angle$ s are suppl

$\angle L + \angle M = 180^\circ$   
 $\angle L = 48^\circ$   
 Consec int  $\angle$ s are suppl

*isosceles trapezoid*

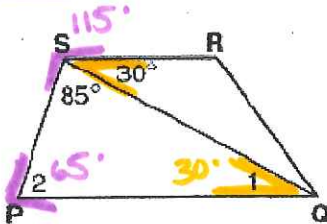
2. Find  $m\angle R$ ,  $m\angle P$  and  $m\angle Q$ .



$\angle S \cong \angle R$   
 $\angle R = 50^\circ$   
 Bases of isos trap are  $\parallel$

$\angle S + \angle P = 180^\circ$   
 $\angle P = 130^\circ$   
 Consecutive interior  $\angle$ s are suppl

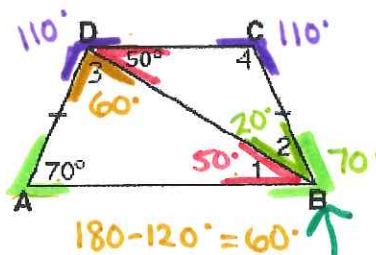
3. Trapezoid PQRS. Find the  $m\angle 1$  and  $\angle 2$ .



$m\angle 1 = 30^\circ$   $\angle 1 \cong \angle RSQ$   
 Alt int  $\angle$ s are  $\cong$

$m\angle 2 = 65^\circ$   
 $180 - 115$

4. Isosceles Trapezoid ABCD.



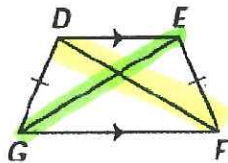
$m\angle 1 = 50^\circ$   
 $m\angle 2 = 20^\circ$   
 $m\angle 3 = 60^\circ$   
 $m\angle 4 = 110^\circ$

diagonals do not bisect the angles of a trap or isostrap

5. Find the values of the variables.

*isos. trap*

$DF = 4x$ ,  $EG = 2x + 16$



$EG \cong DF$  diagonals of an isos trap are  $\cong$

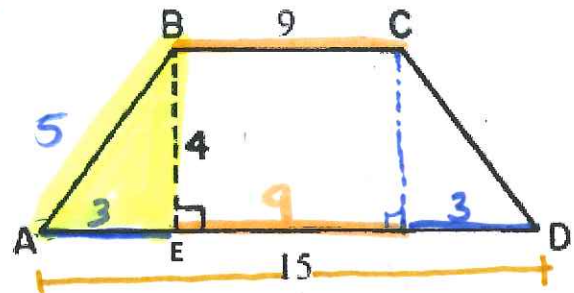
$4x = 2x + 16$

$2x = 16$

$x = 8$

6. In the accompanying figure, isosceles trapezoid ABCD has bases of lengths 9 and 15 and an altitude of length 4. Find AB.

BE



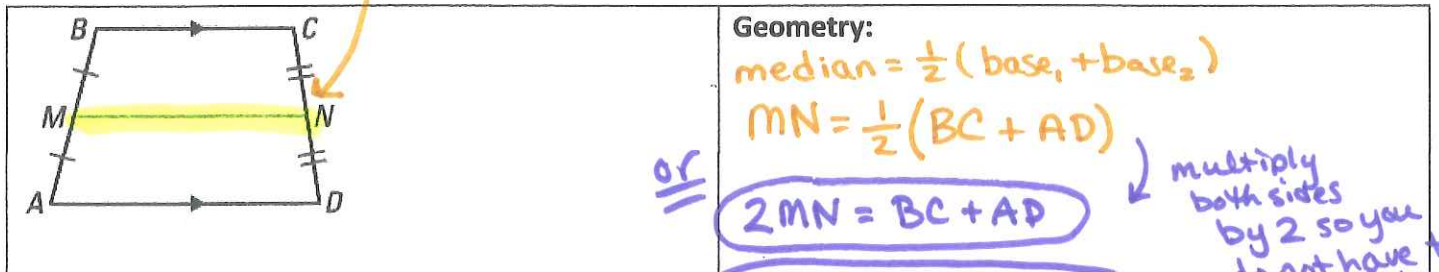
$AE^2 + BE^2 = AB^2$   
 $3^2 + 4^2 = AB^2$   
 $25 = AB^2$   
 $5 = AB$

$15 - 9 = 6 = 2 \cdot AE$   
 $\frac{6}{2} = 3 = AE$

## MEDIAN/MIDSEGMENT OF A TRAPEZOID

Definition: A **median or midsegment** of a trapezoid is a segment that is parallel to the bases and connects the midpoints of the legs.

## MEDIAN/MIDSEGMENT THEOREM



Geometry:

$$\text{median} = \frac{1}{2}(\text{base}_1 + \text{base}_2)$$

$$MN = \frac{1}{2}(BC + AD)$$

or

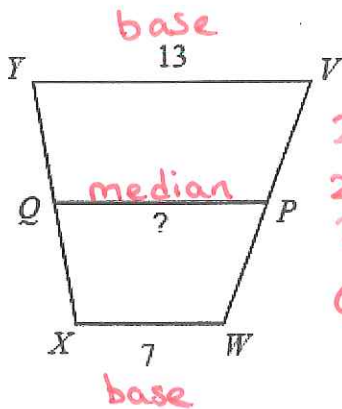
$$2MN = BC + AD$$

$$2 \cdot \text{median} = \text{base}_1 + \text{base}_2$$

multiply both sides by 2 so you do not have to work with fractions!!

7. QP is the median of trapezoid WXYV.

Find QP



$$2 \cdot QP = YV + XW$$

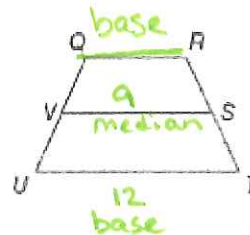
$$2 \cdot QP = 13 + 7$$

$$2 \cdot QP = 20$$

$$QP = 10$$

8. VS is the midsegment of trapezoid QRTU.

If  $VS = 9$  and  $UT = 12$ , find QR.



$$2 \cdot VS = QR + UT$$

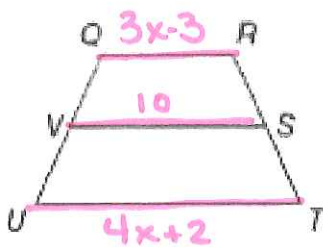
$$2 \cdot 9 = QR + 12$$

$$18 = QR + 12$$

$$6 = QR$$

9. VS is the midsegment of trapezoid QRTU.

If  $RQ = 3x - 3$ ,  $UT = 4x + 2$  and  $VS = 10$ , find  $x$ .



$$2 \cdot VS = QR + UT$$

$$2 \cdot 10 = 3x - 3 + 4x + 2$$

$$20 = 7x - 1$$

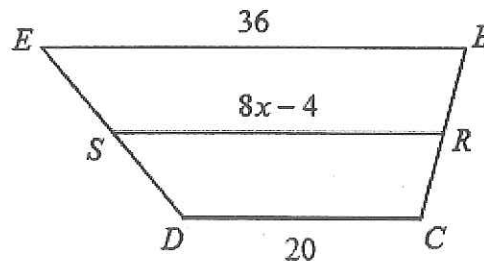
$$21 = 7x$$

$$3 = x$$

check

$$\frac{1}{2}(14 + 6) = 10 \checkmark$$

10. If SR is the midsegment of trapezoid BCDE, find  $x$  and SR.



$$2 \cdot SR = EB + DC$$

$$2(8x - 4) = 36 + 20$$

$$16x - 8 = 56$$

$$16x = 64$$

$$x = 4$$

$$SR = 28$$

check

$$\frac{1}{2}(20 + 36) = 28 \checkmark$$



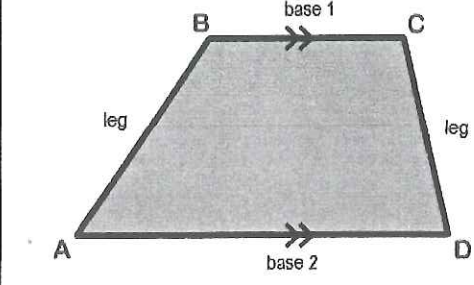
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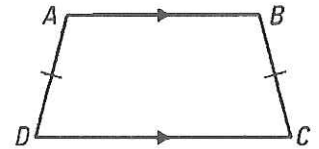
The sides that are parallel are called \_\_\_\_\_. The nonparallel sides are called \_\_\_\_\_.



What is true for the trapezoid because  $BC \parallel AD$ ?

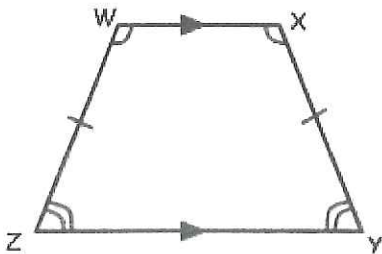
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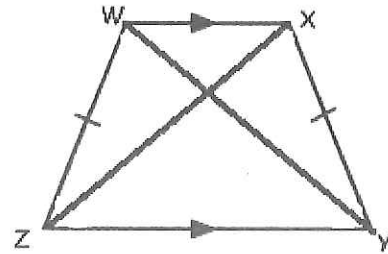
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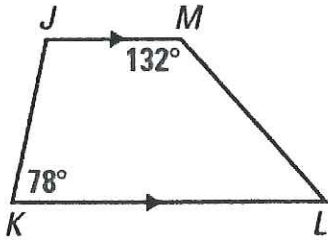


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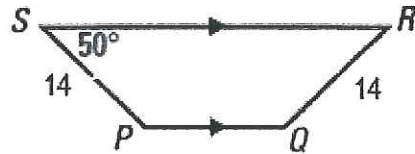
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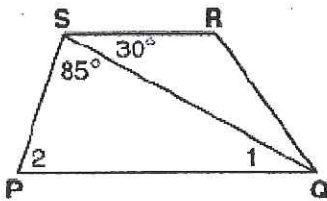
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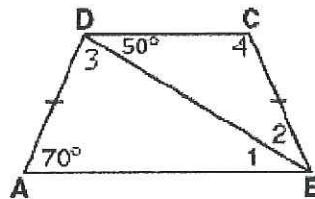
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$m\angle 1 = \underline{\hspace{2cm}}^\circ$

$m\angle 2 = \underline{\hspace{2cm}}^\circ$

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$m\angle 1 = \underline{\hspace{2cm}}^\circ$

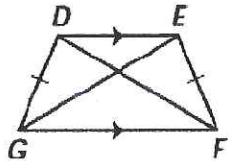
$m\angle 2 = \underline{\hspace{2cm}}^\circ$

$m\angle 3 = \underline{\hspace{2cm}}^\circ$

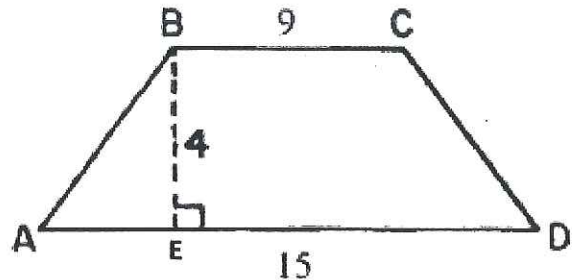
$m\angle 4 = \underline{\hspace{2cm}}^\circ$

5. Find the values of the variables.

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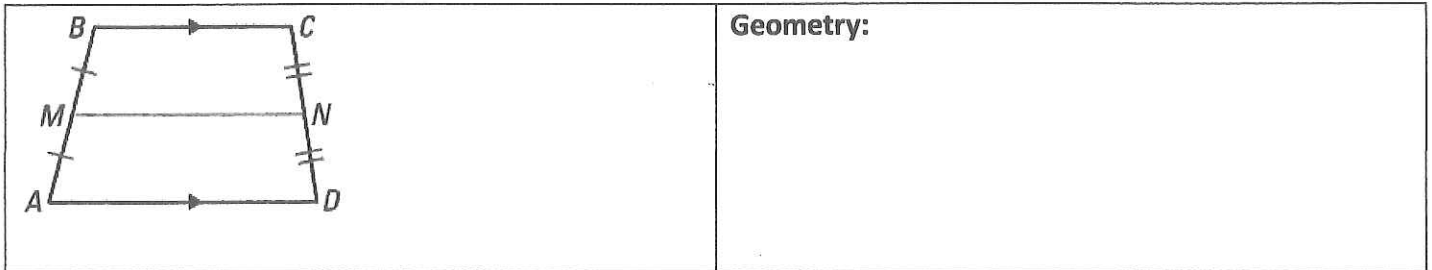
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## MEDIAN/MIDSEGMENT OF A TRAPEZOID

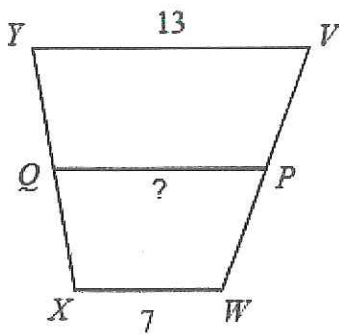
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## MEDIAN/MIDSEGMENT THEOREM



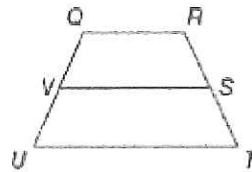
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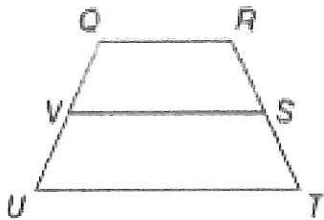


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