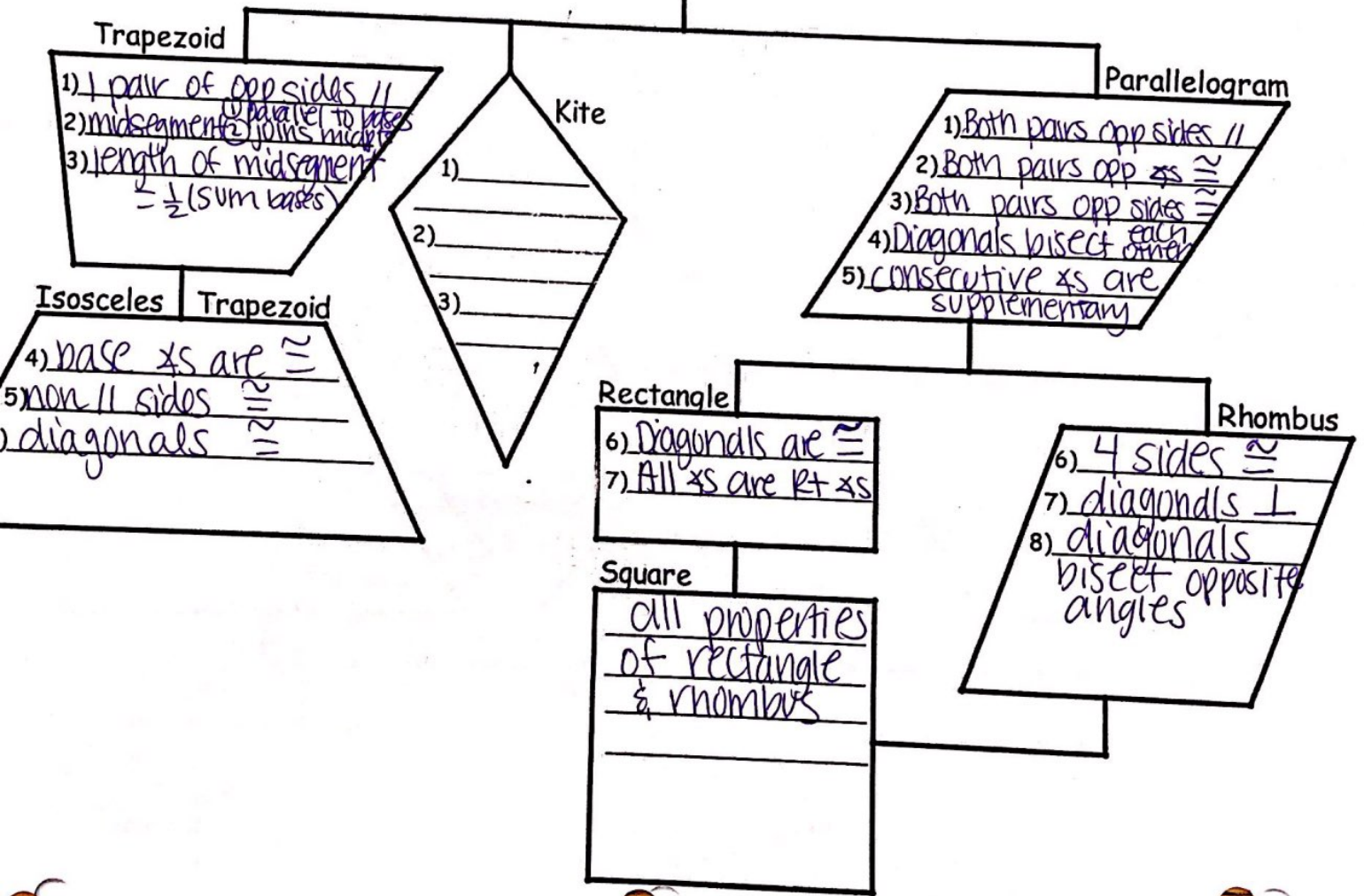


# Properties of Quadrilaterals

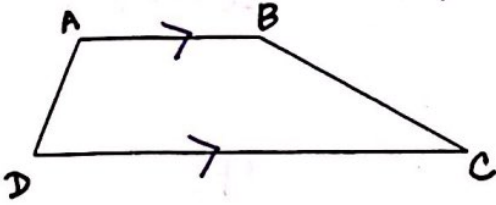


Honors Math 3

Trapezoids

Define:

Trapezoid - Quadrilateral with exactly one pair of parallel sides



Bases are the parallel sides

Legs are the non parallel sides

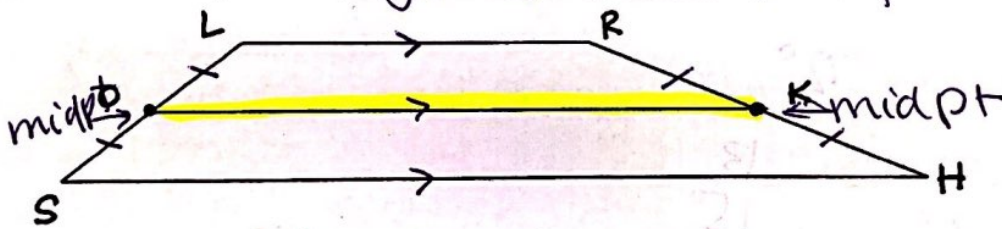
Name both pairs of base angles  $\angle D, \angle C$

$m\angle A + m\angle D = 180^\circ$  and  $m\angle B + m\angle C = 180^\circ$

Isosceles Trapezoid - trapezoid with congruent legs

- base  $\times$ s  $\cong$
- diagonals  $\cong$

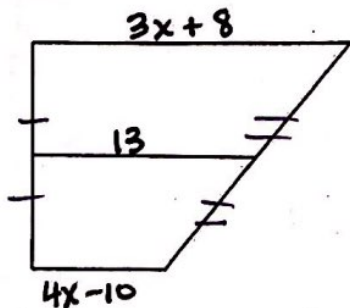
Median of a Trapezoid - joins the midpoints of the legs



The median is parallel to both bases AND is  $= \frac{1}{2}$  (sum of bases)

EXAMPLES:

1. Find x.



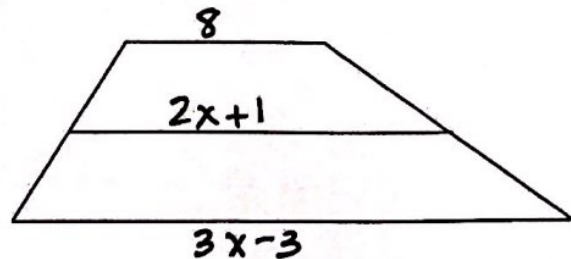
$$3x+8+4x-10 = 2(13)$$

OR

$$\frac{1}{2}(3x+8+4x-10) = 13$$

$$\boxed{x=4}$$

2. Find x.



$$8+3x-3 = 2(2x+1)$$

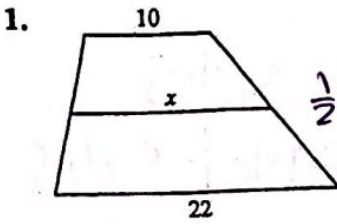
OR

$$\frac{1}{2}(8+3x-3) = 2x+1$$

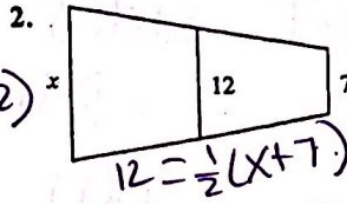
$$\boxed{x=3}$$

# Trapezoids

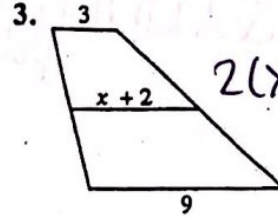
Each diagram shows a trapezoid and its median. Find the value of  $x$ .



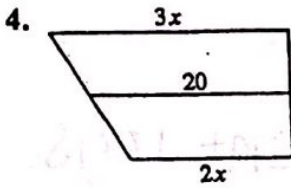
$x = 16$



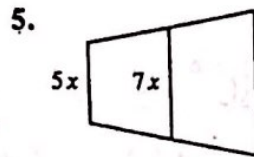
$x = 17$



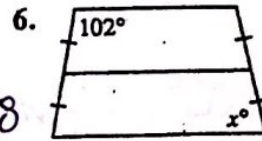
$x = 4$



$x = 8$

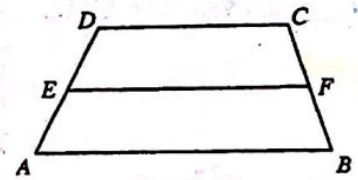


$x = 2$



$x = 78^\circ$

In Exercises 7-12  $\overline{EF}$  is the median of trapezoid  $ABCD$ . Complete.



Exs. 7-12

7. If  $m\angle A = 63$ , then  $m\angle DEF = 103^\circ$  and  $m\angle D = 117^\circ$ .

8. If  $m\angle CFE = 72$ , then  $m\angle B = 72^\circ$  and  $m\angle C = 108^\circ$ .

9. If  $AB = 16$  and  $DC = 10$ , then  $EF = 13$ .

10. If  $AB = 21$  and  $EF = 18$ , then  $DC = 15$ .

11. If  $ABCD$  is isosceles and  $m\angle B = 65$ , then  $m\angle A = 105^\circ$ ,  $m\angle D = 115^\circ$ , and  $m\angle C = 115^\circ$ .

12. If  $ABCD$  is isosceles, name all angles congruent to  $\angle A$ .  $\angle E, \angle F, \angle B$