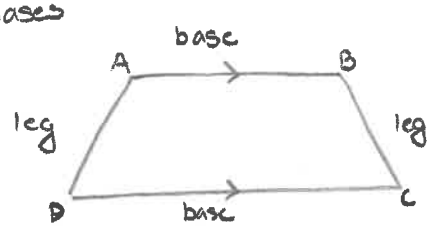
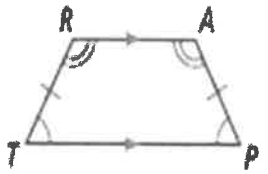
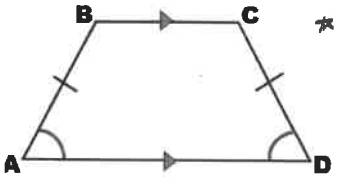
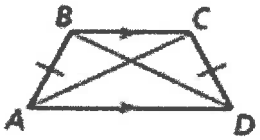
Trapezoid: a quadrilateral with exactly one pair of parallel sides.
(pair of parallel sides → bases)

* nonparallel sides → legs

* ∠A and ∠B are one pair of Base Angles
∠C and ∠D are other pair of Base Angles

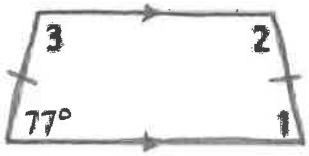


Isosceles Trapezoid:
the legs of a trapezoid are congruent

6.21	If a trapezoid is isosceles, then each pair of base angles is congruent	
6.22	If a trapezoid has one pair of congruent base angles, then it is an isosceles trapezoid	 * think isosceles △
6.23	A trapezoid is isosceles if and only if its diagonals are congruent * goes both ways *	

1. Find the measure of each numbered angle in the isosceles trapezoids below:

a.



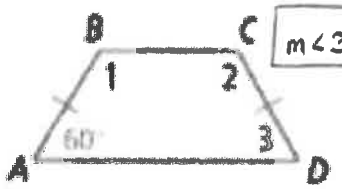
m∠1 = 77°

∠2 = ∠3

m∠2 = m∠3 = 103°

∠2 + ∠3 + 77 + 77 = 360
(same)
x = ∠2 & ∠3
2x + 154 = 360
2x = 206
x = 103°

b.

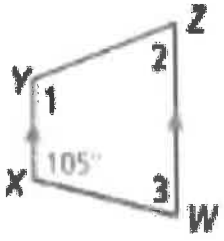


m∠3 = 60°

∠1 + ∠2 + 60 + 60 = 360
(same)
2x + 120 = 360
2x = 240
x = 120°

m∠1 = m∠2 = 120°

c.



$m\angle 1 = 105°$

$\angle 2 + \angle 3 + 105 + 105 = 360$

$2x + 210 = 360$

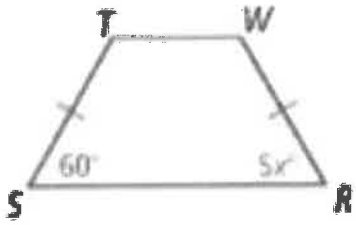
$2x = 150$

$x = 75°$

$m\angle 2 = m\angle 3 = 75°$

2. Find the value of the variables in each isosceles trapezoid:

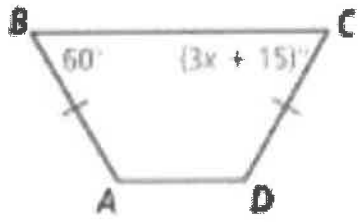
a.



$60 = 5x$

$12 = x$

b.



$60 = 3x + 15$

$45 = 3x$

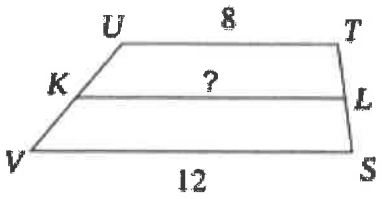
$15 = x$

Midsegment of a Trapezoid: segment that connects the midpoints of the legs of the trapezoid

Midsegment Theorem for Trapezoids	The midsegment of a trapezoid is parallel to each base and its length is half the sum of of the lengths of the bases	 $FE = \frac{1}{2}(AB + DC)$

3. Find the length of each midsegment:

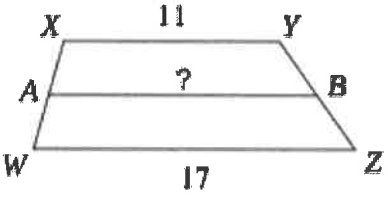
a.



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

$= 10$

b.

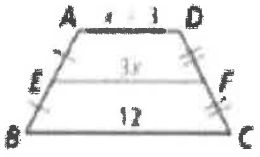


$AB = \frac{1}{2}(11+17)$

$= 14$

4. Find the value of the variables:

a.



$3x = \frac{1}{2}(x+3+12)$

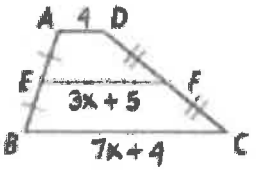
$3x = \frac{1}{2}(x+15)$

$6x = x+15$

$5x = 15$

$x = 3$

b.

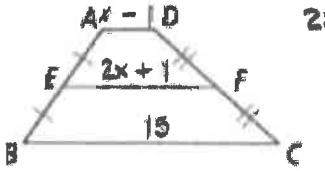


$3x+5 = \frac{1}{2}(4+7x+4)$

$6x+10 = 8+7x$

$2 = x$

c.



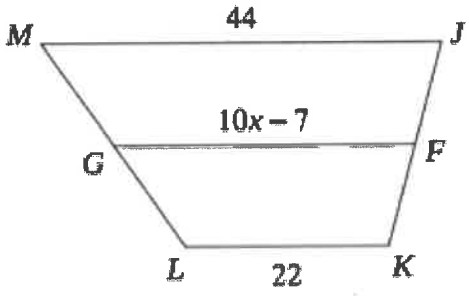
$2x+1 = \frac{1}{2}(x-1+15)$

$4x+2 = x+14$

$3x = 12$

$x = 4$

d.



$10x-7 = \frac{1}{2}(44+22)$

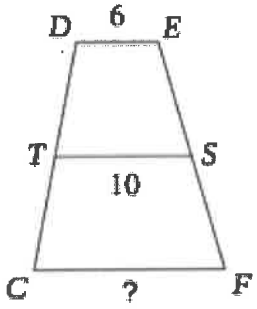
$10x-7 = \frac{1}{2}(66)$

$10x-7 = 33$

$10x = 40$

$\boxed{x = 4}$

5. Find the length of the base of the trapezoid:



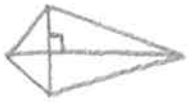
$10 = \frac{1}{2}(6+x)$

$20 = 6+x$

$\boxed{14 = x}$

Kite: a quadrilateral w/ exactly 2 pairs of consecutive congruent sides

* opposite sides are NOT congruent or parallel

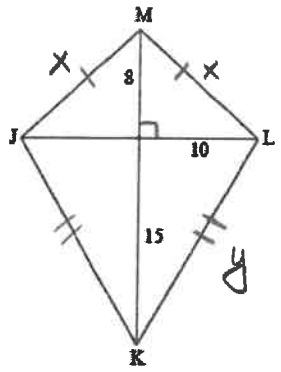
6.25	If a quadrilateral is a kite, then its diagonals are perpendicular	
6.26	If a quadrilateral is a kite then exactly one pair of opposite angles are congruent	

vertex angles: angles between the ≅ sides

ex) ∠A and ∠B

6. Calculate the perimeter of the Kite below:

a.



$8^2 + 10^2 = x^2$

$64 + 100 = x^2$

$164 = x^2$

$\sqrt{164} = x$

$12.81 = x$

$10^2 + 15^2 = y^2$

$100 + 225 = y^2$

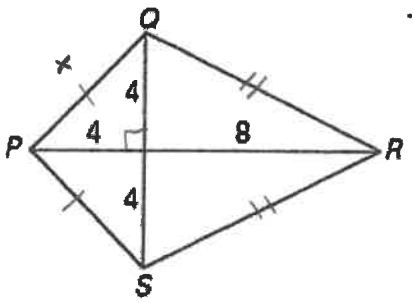
$\sqrt{325} = y$

$18.03 = y$

$12.81 + 12.81 + 18.03 + 18.03 = P$

$61.68 = P$

b.



$4^2 + 4^2 = x^2$

$\sqrt{32} = x$

$4^2 + 8^2 = y^2$

$16 + 64 = y^2$

$80 = y^2$

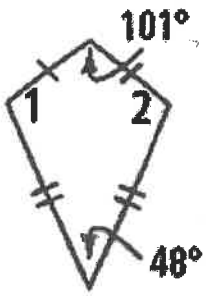
$\sqrt{80} = y$

$P = \sqrt{80} + \sqrt{80} + \sqrt{32} + \sqrt{32}$

$= 29.2$

7. Find the missing angles of the kites below:

a.



$m\angle 1 = m\angle 2$

let $x = m\angle 1$ and $m\angle 2$

$x + x + 101 + 48 = 360$

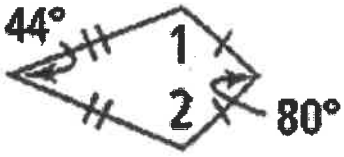
$2x + 149 = 360$

$2x = 211$

$x = 105.5°$

$m\angle 1 = m\angle 2 = 105.5°$

b.



$80 + 44 + \underbrace{m\angle 1 + m\angle 2}_{\text{same}} = 360$

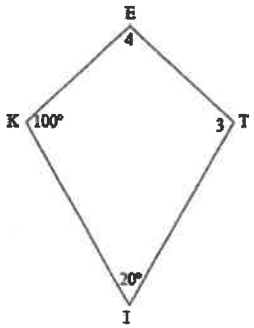
$124 + 2x = 360$

$2x = 236$

$x = 118$

$m\angle 1 = m\angle 2 = 118°$

c.



$m\angle 3 = 100°$

$m\angle 4 = 140°$

$100 + 100 + 20 + x = 360$

$220 + x = 360$

$x = 140°$