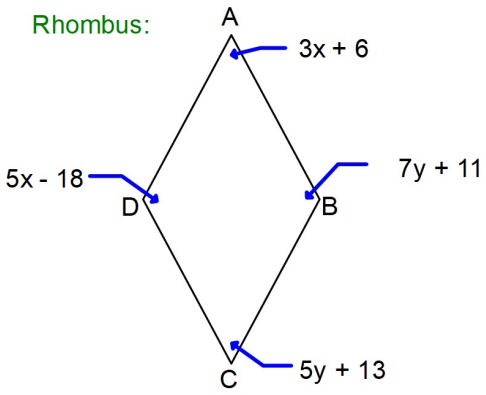
Find the value of each variable and the measure of each angle.

Rhombus:



There are several ways to solve this problem. One method is show.

Since a Rhombus is also a Parallelogram, opposite sides are parallel. This means that angles A and D are same-side interior angles and are, therefore, supplementary.

$3x+6 + 5x-18 = 180$
$8x-12 = 180$
$8x=192$
$x = 24$

Angle A = 3(24)+6 = 78°
Angle D = 5(24) -18 = 102°

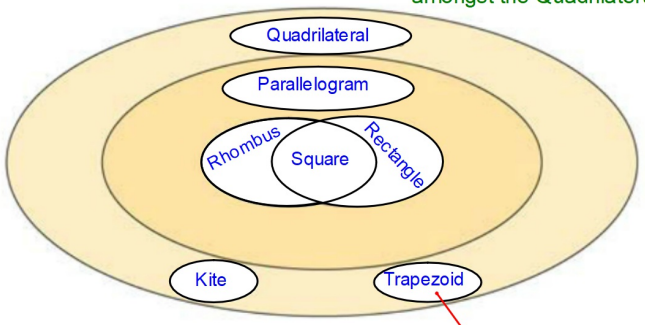
Angles A and B are also same side interior angles:

$78 + 7y +11 = 180$
$7y+11 = 102$
$7y = 91$
$y = 13$

Angle B = 7(13) +11 = 102°
Angle C = 5(13) +13 = 78°

Quadrilateral Venn Diagram

This another way to show the relationships amongst the Quadrilaterals



Inside this circle should be another circle with:
Isosceles Trapezoid

Is each statement true?

1. Some Parallelograms are Rhombuses.

   True

2. All Rectangles are squares.

   FALSE

3. Every Trapezoid is a Quadrilateral.

   True

Fill in the blank with a word to make each statement

1. ___ALL___ Squares are Rhombuses.

2. If a polygon is an Isosceles Trapezoid, then it is a ___Quadrilateral OR Trapezoid___.

3. ___Some___ Quadrilaterals are Kites.

Hwk #2 Sec 6-1

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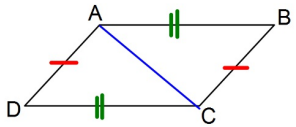
Problems 21, 22, 24-26, 36-39

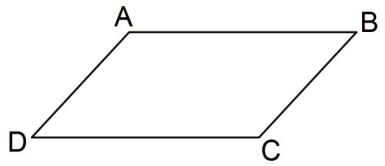
Definition of a Parallelogram:
A quadrilateral with both pairs of opposite sides parallel.

Section 6-2: Properties of Parallelograms.

Theorem 6-1

Opposite sides of a parallelogram are congruent.





Name a pair of consecutive angles.

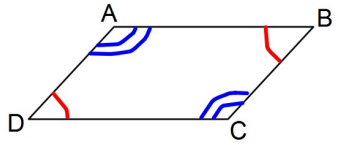
$\angle A$ & $\angle B$ $\angle B$ & $\angle C$ $\angle C$ & $\angle D$ $\angle D$ & $\angle A$

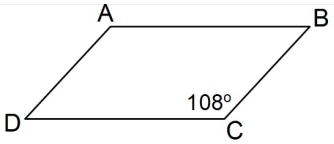
What is the relationship between any pair of consecutive angles in a parallelogram?

Supplementary, because they are actually same-side interior angles.

Theorem 6-2

Opposite angles of a parallelogram are congruent.





Find the measure of the other angles in this Parallelogram

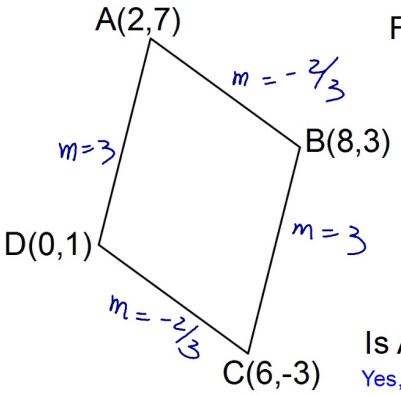
There are numerous ways to find these answers. An example method is shown.

$\angle B$ & $\angle C$ are consecutive angles which means they are supplementary: $\angle B = 180 - \angle C = 180 - 108$

$\angle B = 72°$

$\angle A$ & $\angle C$ are opposite angles which means that they are congruent: $\angle A = \angle C = 108°$

$\angle D$ & $\angle B$ are opposite angles which means that they are congruent: $\angle D = \angle B = 72°$



Find the slope of all four sides.

AB $m = \frac{7-3}{2-8} = \frac{4}{-6} = -\frac{2}{3}$

BC $m = \frac{3--3}{8-6} = \frac{6}{2} = 3$

CD $m = \frac{1--3}{0-6} = \frac{4}{-6} = -\frac{2}{3}$

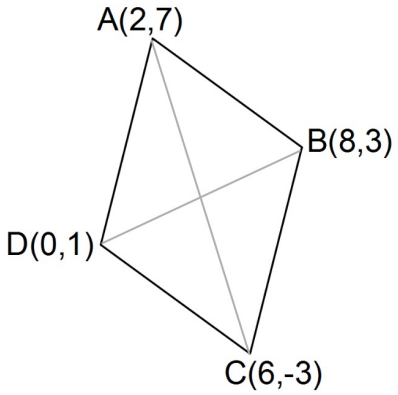
DA $m = \frac{7-1}{2-0} = \frac{6}{2} = 3$

Is ABCD a Parallelogram?

Yes, because both pair of opp sides are parallel (same slope)

Is ABCD a Rectangle?

No. All angles would need to be right angles which means consecutive sides would have to have slopes that are opposite reciprocals but 3 and -2/3 are not opposite reciprocals.



What are the two diagonals of this Parallelogram?

$\overline{DB}$ & $\overline{AC}$

Find the midpoint of each diagonal.

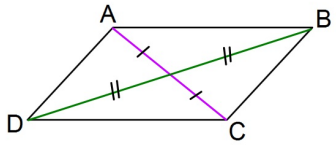
$\overline{DB}$: $\left(\frac{8+0}{2}, \frac{3+1}{2}\right) = (4, 2)$

$\overline{AC}$: $\left(\frac{2+6}{2}, \frac{7+-3}{2}\right) = (4, 2)$

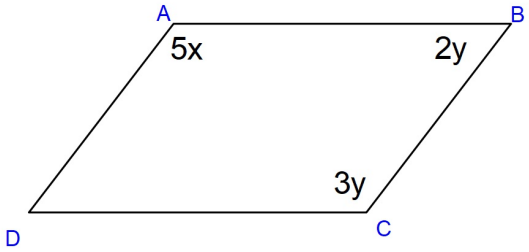
Since the two diagonals have the same midpoint they must cut each other in half. Another way to say this is that the diagonals bisect each other.

Theorem 6-3

The diagonals of a parallelogram bisect each other.



What is the value of x in this parallelogram?



Angles B and C are consecutive angles: $2y + 3y = 180$

$5y = 180$

$y = 36$

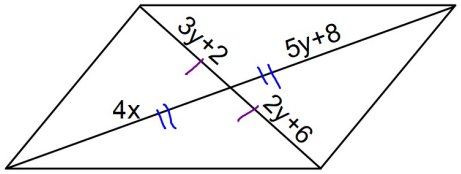
Angles A and C are opposite angles: $5x = 3y$

$5x = 3(36)$

$5x = 108$

$x = 21.6$

Find the values of x and y.



Diagonals bisec each other

$2y + 6 = 3y + 2$

$-2y \quad -2y$

$6 = y + 2$

$-2 \quad -2$

$y = 4$

$4x = 5y + 8$

$4x = 5(4) + 8$

$\frac{4x}{4} = \frac{28}{4}$

$x = 7$