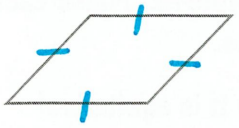
All Parallelograms

Rhombus Corollary: Def^n

A quadrilateral is a rhombus iff it has 4 ≅ sides

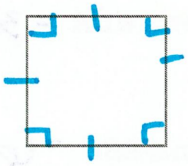


Rectangle Corollary: Def^n

A quadrilateral is a rectangle iff it has 4 ≅ angles

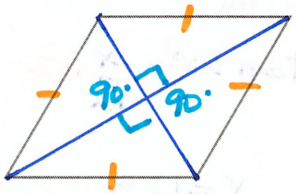
Square Corollary:

A quadrilateral is a square iff it has 4 ≅ angles AND 4 ≅ sides
(Rectangle) (Rhombus)



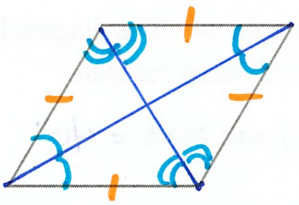
Parallelogram with Perpendicular Diagonals Theorem (Theorem 8.11):

A parallelogram is a rhombus (↳ squares too) iff its diagonals are perpendicular



Parallelogram with Diagonals Bisecting Angles Theorem (Theorem 8.12):

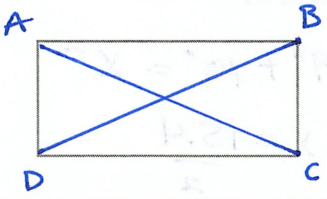
A parallelogram is a rhombus (↳ square too) iff each diagonal bisect a pair of opposite angles



Parallelogram with Congruent Diagonals Theorem (Theorem 8.13):

A parallelogram is a rectangle (↳ squares too) iff its diagonals are Congruent

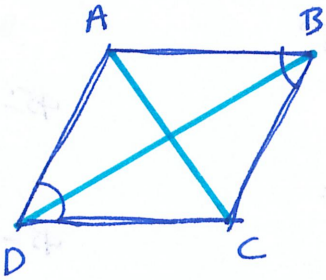
If $\overline{AC} \cong \overline{BD}$ then ABCD is a rectangle



Example #1: For any rhombus ABCD, decide whether the statement is *always* or *sometimes* true. Draw a diagram and explain your reasoning.

a.) $\angle ABC \cong \angle CDA$

Always: Rhombuses are parallelograms



b.) $\overline{CA} \cong \overline{DB}$

Sometimes: if it is a square.

Example #2: Name each quadrilateral- *parallelogram, rectangle, rhombus* and *square*- for which the statement is true.

a.) It is equilateral

Square, Rhombus

b.) The diagonals are congruent

Square, Rectangle

c.) It can contain obtuse angles

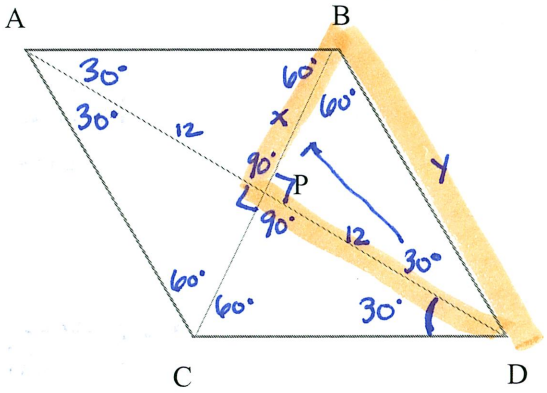
Rhombus, Parallelogram

d.) It contains no acute angles

Square, Rectangle

Example #3: The diagonals of rhombus ABCD interest at P. Given that $m\angle ADC = 30°$ and $DP = 12$, find the indicated measure.

Special Δ or Soh-Cah-Toa



a.) $m\angle BDA = 30°$

b.) $m\angle BPD = 90°$

c.) $m\angle ABC = 60°$

d.) DA = 24

e.) BP

$12(\tan 30°) = \frac{x}{12} \cdot 12$

$x = 6.9$

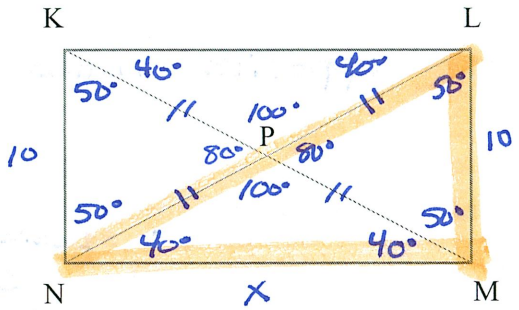
f.) BD

$y(\sin 60°) = \frac{12}{y} \cdot y$

$\frac{y(\sin 60°)}{\sin 60°} = \frac{12}{\sin 60°}$

$y = 13.9$

Example #4: The diagonals of rectangle KLMN interest and P. Given that $m\angle MKN = 50°$ and $LM = 10$, find the indicated measure.



a.) $m\angle MKL = 40°$

b.) $m\angle KPN = 80°$

c.) PM

$11.9^2 + 10^2 = x^2$

$LN \rightarrow x = 15.4$

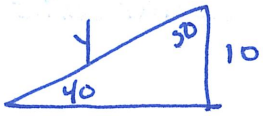
$\frac{}{2}$

$PM = 7.7$

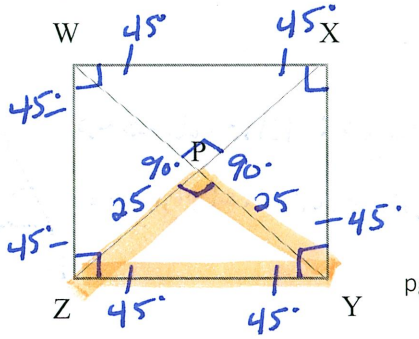
d.) MN

$10(\tan 50°) = \left(\frac{x}{10}\right)10$

$11.9 = x$



Example #5: The diagonals of square WXYZ interest and P. Given that $PZ = 25$, find the indicated measure.



a.) $m\angle WPZ = 90°$

b.) $m\angle WXP = 45°$

c.) PY = 25

d.) ZY

$25^2 + 25^2 = x^2$

$x = 35.4$