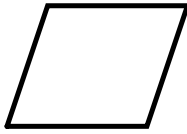


5.2 Properties of a Rhombus

We are going to learn all about rhombus's...or is it rhombii?

Properties of Special Parallelograms

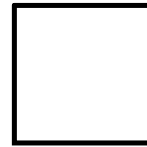
There are three special parallelogram that we will learn about



Rhombus



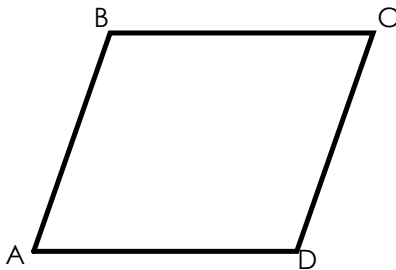
Rectangle



Square

There are three SPECIAL properties we know are true for EVERY Rhombus

A parallelogram is a rhombus if all sides are congruent

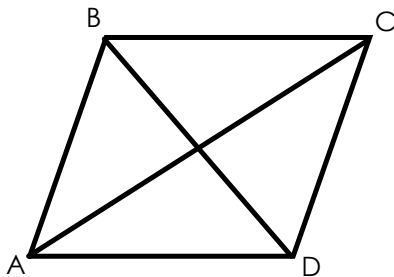


If we know

$$BC \cong \underline{\hspace{1cm}} \cong \underline{\hspace{1cm}} \cong \underline{\hspace{1cm}}$$

Then ABCD is a rhombus

A parallelogram is a rhombus if the diagonals are perpendicular

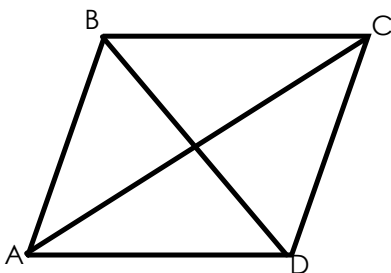


If we know

$$BD \perp \underline{\hspace{1cm}}$$

Then ABCD is a rhombus

A parallelogram is a rhombus if the diagonals bisect vertex angles

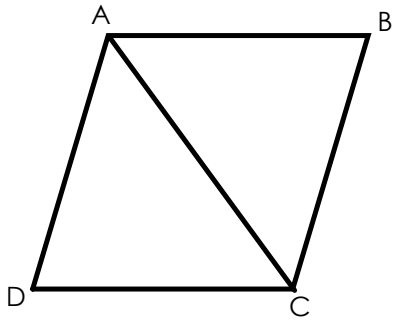


If we know

$$\begin{aligned} \angle ABD = \angle CBD \text{ and } \angle ADB = \angle CDB \\ \text{or} \\ \angle BAC = \angle DAC \text{ and } \angle BCA = \angle DCA \end{aligned}$$

Then ABCD is a rhombus

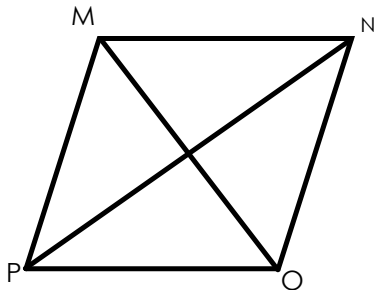
Given: In parallelogram ABCD, $\angle BAC \cong \angle DAC$ and $\angle DCA \cong \angle BCA$.
 Prove that ABCD is a rhombus.



Proof

Parallelogram ABCD is a rhombus because

Given: In quadrilateral MNOP, diagonal $\overline{MO} \perp \overline{NP}$
 Prove that parallelogram MNOP is a rhombus



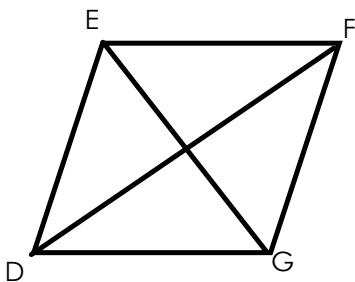
Proof

Parallelogram MNOP is a rhombus because

Given: In parallelogram WXYZ, $\overline{WX} = \overline{ZY} = \overline{WZ} = \overline{XY}$.
 Prove that WXYZ is a rhombus.

Proof

Which of the following statements proves parallelogram DEFG is a rhombus?

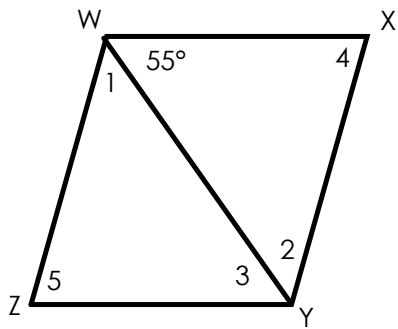


1) $\angle E = \angle G$ and $\angle D = \angle F$

2) $\overline{EG} = \overline{DF}$

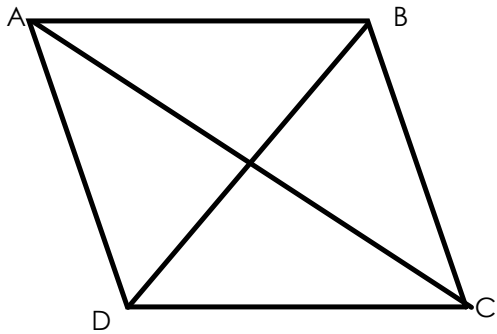
3) $EF = 4$, $FG = 4$, $DG = 4$, and $ED = 4$

In rhombus WXYZ, $\angle XWY = 55^\circ$. Fill out the chart below for the missing angles. Justify your answers.



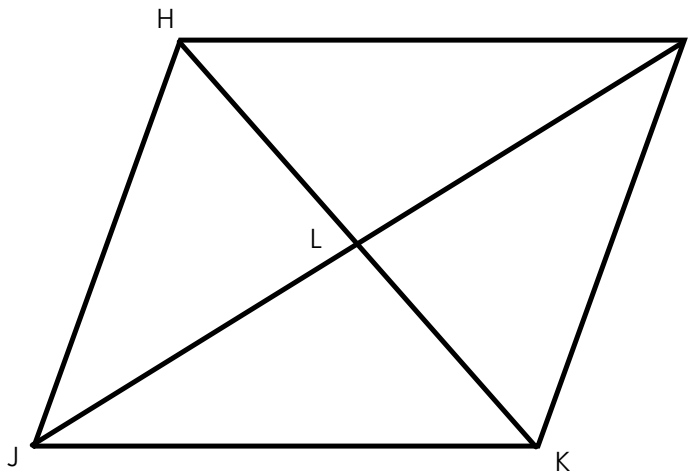
Angle	Measure	Reason
$\angle 1$		
$\angle 2$		
$\angle 3$		
$\angle 4$		
$\angle 5$		

In rhombus ABCD, $\angle BCD = 84^\circ$. Fill out the chart below of the missing angles. Justify your answers.



Angle	Measure	Reason
$\angle DCA$		
$\angle ADC$		
$\angle BDC$		

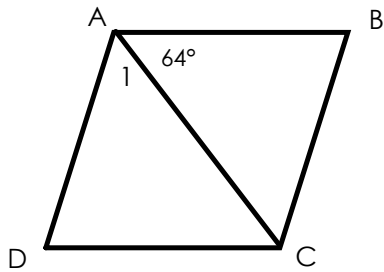
IJ and HK intersect at point L in rhombus HIKJ. HK = 12 and JI = 16. Find the length of HI and state the property you used to solve it.



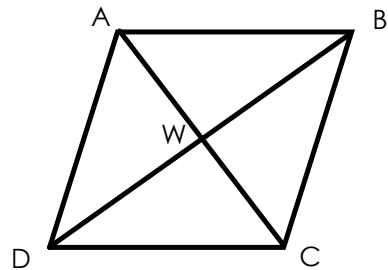
Property

Independent Practice

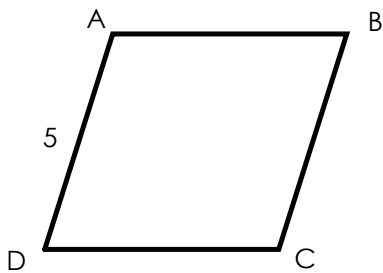
Fill in the missing side lengths or angles of each rhombus. State the property you used to solve the problem



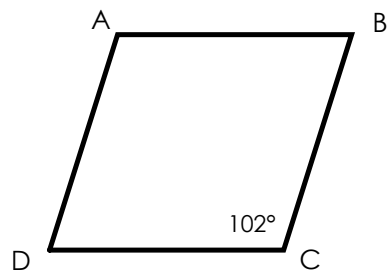
$\angle 1 = \underline{\hspace{2cm}}$, because $\underline{\hspace{2cm}}$
 $\underline{\hspace{2cm}}$



$\angle BWC = \underline{\hspace{2cm}}$, because $\underline{\hspace{2cm}}$
 $\underline{\hspace{2cm}}$

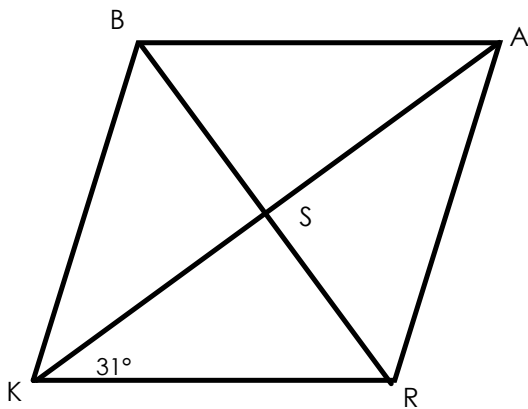


$AB = \underline{\hspace{2cm}}$, because $\underline{\hspace{2cm}}$
 $\underline{\hspace{2cm}}$



$\angle B = \underline{\hspace{2cm}}$, because $\underline{\hspace{2cm}}$
 $\underline{\hspace{2cm}}$

Rhombus BARK is pictured below. Fill in the missing information and state the property that you used to answer the question

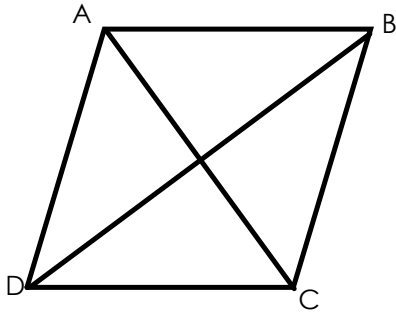


$\angle BKA = \underline{\hspace{2cm}}$, because $\underline{\hspace{2cm}}$
 $\underline{\hspace{2cm}}$

$\angle KSR = \underline{\hspace{2cm}}$, because $\underline{\hspace{2cm}}$
 $\underline{\hspace{2cm}}$

$AR = \underline{\hspace{2cm}}$, because $\underline{\hspace{2cm}}$
 $\underline{\hspace{2cm}}$

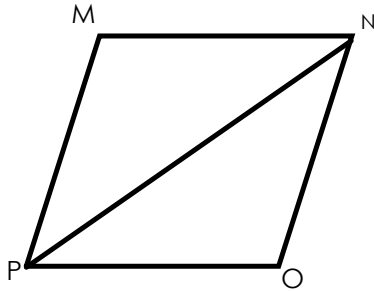
Given: In quadrilateral ABCD, diagonal $\overline{AC} \perp \overline{DB}$
 Prove that parallelogram ABCD is a rhombus



Proof



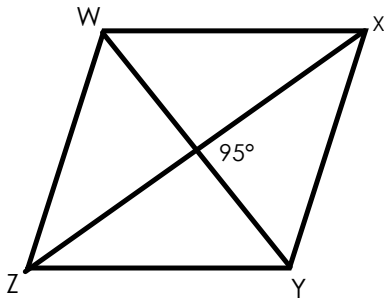
Given: In parallelogram MNOP, $\angle MNP \cong \angle ONP$ and $\angle MPN \cong \angle OPN$.
 Prove that MNOP is a rhombus.



Proof



Given: In quadrilateral WXYZ, $WX \parallel ZY$, $WZ \parallel XY$ and $\angle XTY = 95^\circ$.
 Prove that WXYZ is a parallelogram but NOT a rhombus



Proof



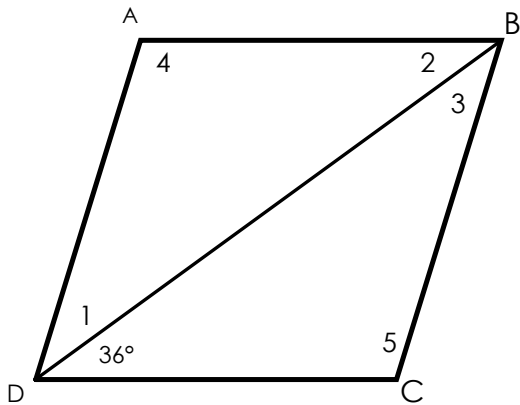
Which of the following properties proves a quadrilateral is a rhombus?

- A) Opposite sides are congruent
- B) Diagonals bisect each other
- C) Opposite angles are congruent
- D) Diagonals bisect opposite angles

Which of the following does NOT prove a parallelogram is a rhombus?

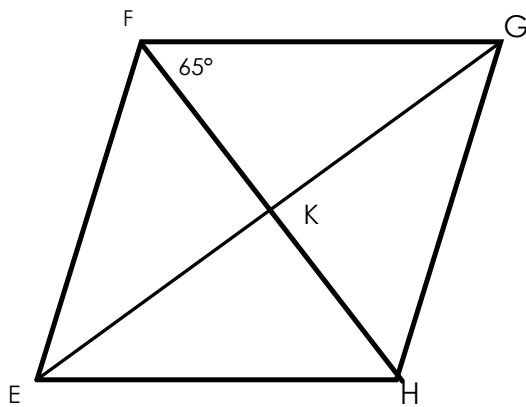
- A) All sides are congruent
- B) Opposite angles are congruent
- C) Diagonals are perpendicular

In rhombus ABCD, $\angle BDC = 36^\circ$. Find the measures of the angles in the chart below. Justify your answer.



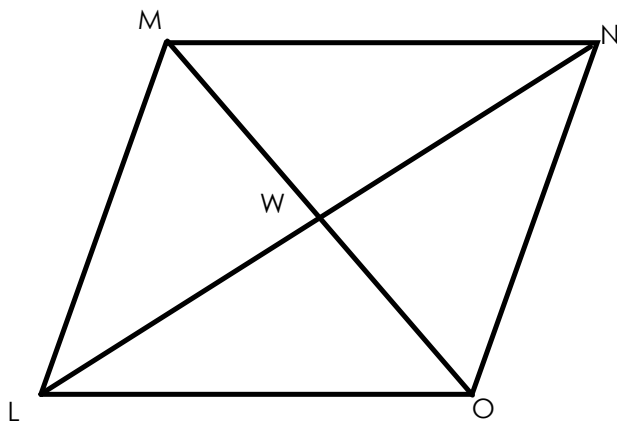
Angle	Measure	Reason
$\angle 1$		
$\angle 2$		
$\angle 3$		
$\angle 4$		
$\angle 5$		

Parallelogram FEHG is a rhombus and $\angle GFH = 65^\circ$. Find the measures of the angles in the chart below. Justify your answer.



Angle	Measure	Reason
$\angle EFH$		
$\angle GKH$		
$\angle FEH$		
$\angle FEG$		

In rhombus LMNO, $LN = 24$ and $MO = 18$.



1) What is the length of \overline{MW} and \overline{LW} ?

$$MW = \underline{\hspace{2cm}}$$

$$LW = \underline{\hspace{2cm}}$$

2) What is the length of \overline{LM} ?

3) What is the perimeter of LMNO?

