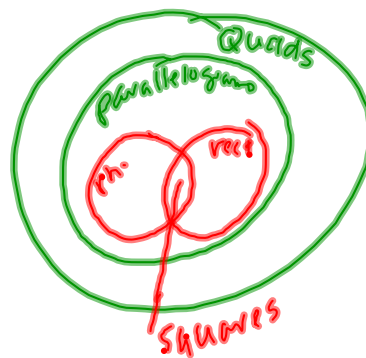


Rhombus: A parallelogram with 4 congruent sides

Rectangles A parallelogram with 4 right angles

Square: A parallelogram with 4 congruent sides and 4 right angles; all squares are rectangles and rhombuses



Indicate whether the statement is always, sometimes or never true.

If a quadrilateral is a rectangle, then it is a parallelogram. always

If a quadrilateral is a parallelogram, then it is a rhombus. sometimes

If a quadrilateral is a square, then it is a rhombus. always

If a quadrilateral is a rectangle, then it is a rhombus. sometimes

If a rhombus is a square, then it is a rectangle. always

Rhombus Corollary: A quadrilateral is a rhombus if and only if it has four \cong sides.

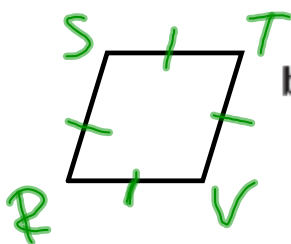
Rectangle Corollary: A quadrilateral is a rectangle if and only if it has four right \angle s.

Square Corollary: A quadrilateral is a square if and only if it has four right \angle s and four \cong sides. A square is a rectangle and a rhombus.

For any rhombus $RSTV$, decide whether the statement is always or sometimes true. Draw a sketch and explain your reasoning.

a. $\angle S \cong \angle V$

always

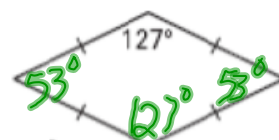


b. $\angle T \cong \angle V$

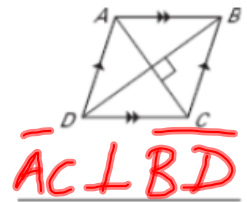
Sometimes
(when it's a square)

Given the indicated information, classify the given quadrilateral and find the remaining angles.

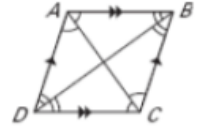
rhombus



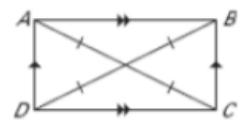
A parallelogram is a rhombus if and only if its diagonals are perpendicular.
(Theorem 8.11)



A parallelogram is a rhombus if and only if each diagonal bisects the vertex angles.
(Theorem 8.12)

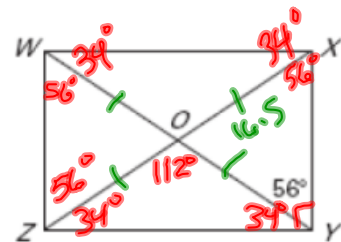


A parallelogram is a rectangle if and only if its diagonals are congruent.
(Theorem 8.13)



The diagonals of rectangle WXYZ intersect at O. Given that $m\angle XYW = 56^\circ$ and $WY = 33$, find the indicated measures.

$m\angle ZOY$ 112°
 $m\angle XWO$ 34°
 XO 16.5



Without using graph paper. Classify the quadrilateral ABCD with vertices at the given coordinates.

A(-3,4) B(0,6) C(2,3) D(-1,1)

parallelogram? *Yes*

$$\left(\frac{-3+2}{2}, \frac{4+3}{2}\right) \stackrel{?}{=} \left(\frac{0-1}{2}, \frac{6+1}{2}\right)$$

$$\left(-\frac{1}{2}, \frac{7}{2}\right) = \left(-\frac{1}{2}, \frac{7}{2}\right)$$

$$AB = 2\sqrt{3}$$

$$BC = 2\sqrt{3}$$

$$AC = \sqrt{26}$$

$$CD = 2\sqrt{3}$$

$$AD = 2\sqrt{3}$$

$$BD = \sqrt{26}$$

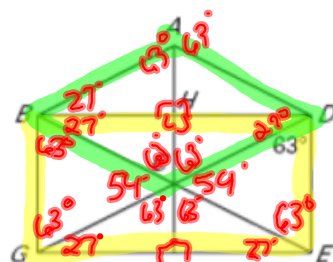
rhombus

rect

∴ square

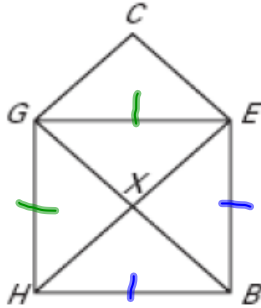
In the diagram shown, **BDEG** is a rectangle and **ABCD** is a rhombus. Find the measure of the indicated angle.

- | | | | |
|------------------|-------------|------------------|------------|
| 6. $\angle GDB$ | <i>27°</i> | 7. $\angle ABC$ | <i>54°</i> |
| 8. $\angle DAB$ | <i>126°</i> | 9. $\angle BCG$ | <i>54°</i> |
| 10. $\angle GCE$ | <i>126°</i> | 11. $\angle DEG$ | <i>90°</i> |
| 12. $\angle AHB$ | <i>90°</i> | 13. $\angle DGB$ | <i>63°</i> |



GIVEN: $\triangle GEC \cong \triangle GHX$
 $GEBH$ is a parallelogram.

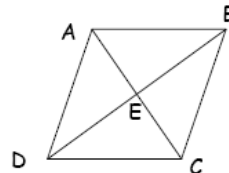
PROVE: $GEBH$ is a rhombus.



$\triangle GEC \cong \triangle GHX$
 $GEBH$ is \square
 $\overline{GH} \cong \overline{GE}$
 $\overline{GH} \cong \overline{EB}$;
 $\overline{GE} \cong \overline{HB}$
 $\overline{GH} \cong \overline{GE} \cong \overline{EB} \cong \overline{HB}$
 $GEBH$ is a rhombus

given
 CPCTC
 If \square , opp sides \cong
 transitive prop
 If 4 \cong sides,
 then rhombus

Given $\square ABCD$; diagonals \overline{AC} and \overline{BD} ;
 $\overline{AC} \perp \overline{BD}$



Prove $ABCD$ is a rhombus

Statements

1. $\square ABCD$, diagonals \overline{AC} and \overline{BD}
2. $\overline{AE} \cong \overline{AE}$
3. $\overline{AC} \perp \overline{BD}$
4. $\angle AED$ and $\angle AEB$ are right \angle 's
5. $\overline{DE} \cong \overline{BE}$
6. $\triangle AED \cong \triangle AEB$
7. $\overline{AD} \cong \overline{AB}$
8. $\overline{AB} \cong \overline{DC}$; $\overline{AD} \cong \overline{BC}$
9. $\overline{DC} \cong \overline{BC}$
10. $\square ABCD$ is a rhombus

Reasons

1. Given
2. reflexive
3. Given
4. def of \perp lines
5. If \square , then diag. bisect each other
6. SAS \cong postulate.
7. CPC TC
8. If \square , then opp sides \cong
9. transitive
10. If 4 \cong sides, then rhombus.