Parallelograms

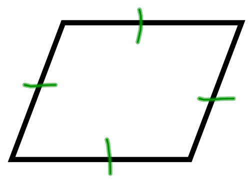
- 2 prs. opp sides $\parallel$
- 2 prs. opp sides $\cong$
- 2 prs. opp $\measuredangle$s $\cong$
- Cons. $\measuredangle$s supp.
- diags bis. each other

Square
rhombus
rectangle

Special Types of Parallelograms

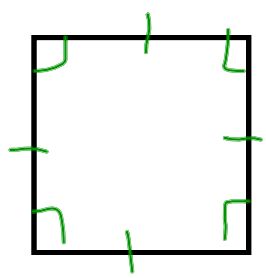
6.4 Rhombuses, Rectangles, and Squares

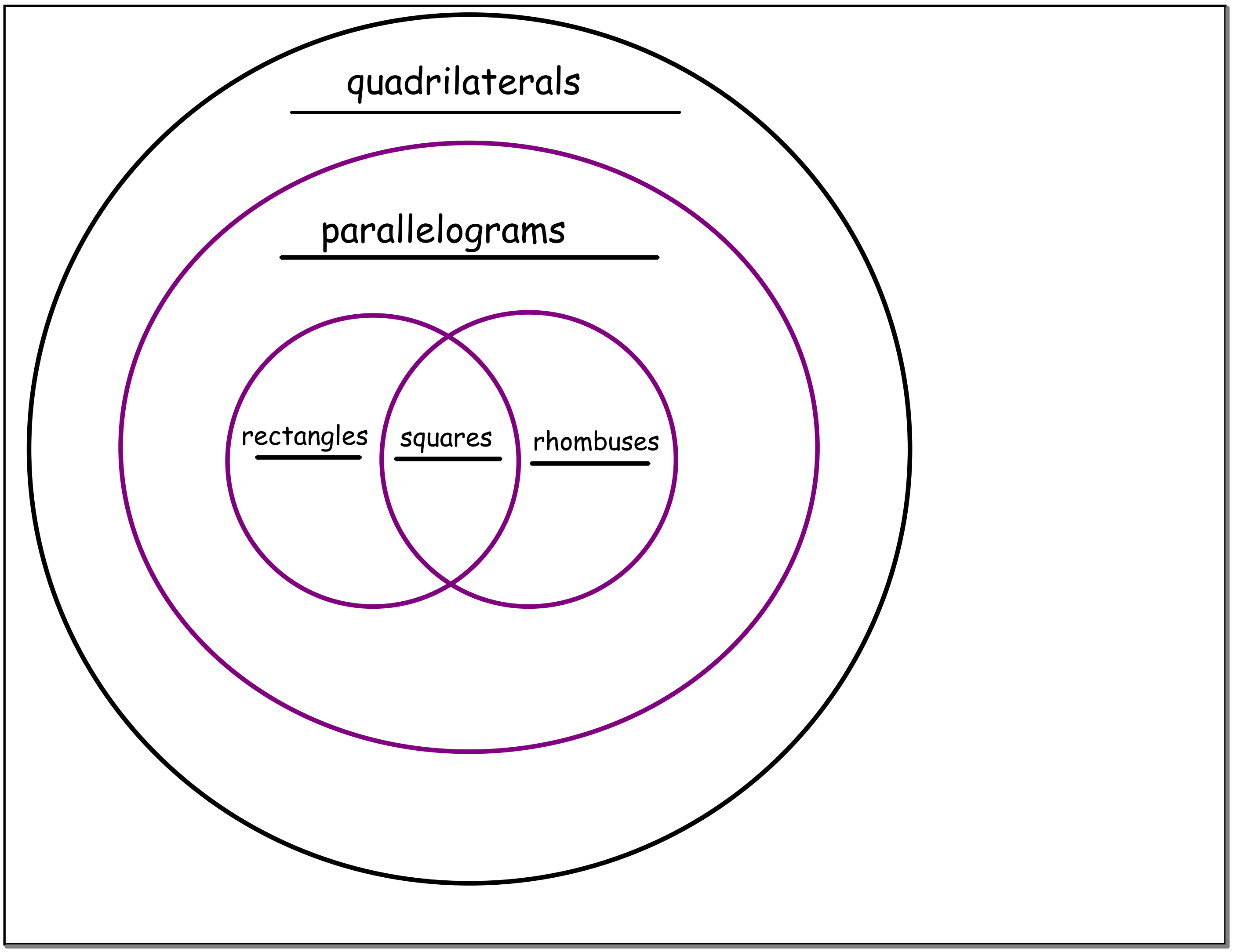
rhombus: quad. with 4 $\cong$ sides



rectangle: quad. with 4 rt. angles

square: quad. with 4 $\cong$ sides and 4 rt. angles




quadrilaterals
parallelograms
rectangles
squares
rhombuses

A, S, or N.

1. A rhombus is a rectangle. S

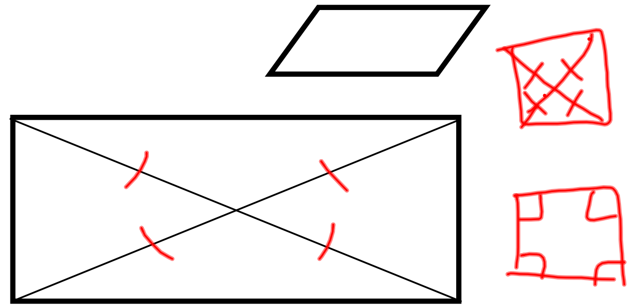
2. A parallelogram is a rectangle. S

True or False.

3. All squares are rectangles.

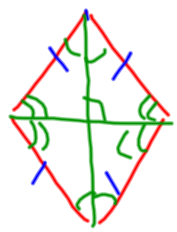
4. All rectangles are squares.

Properties of Rectangles

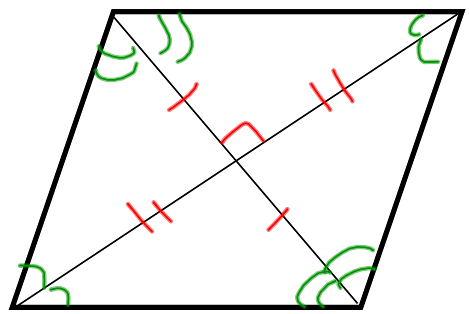


1. If rect. then ▱

2. If rect. then the diags. $\cong$



Properties of Rhombuses

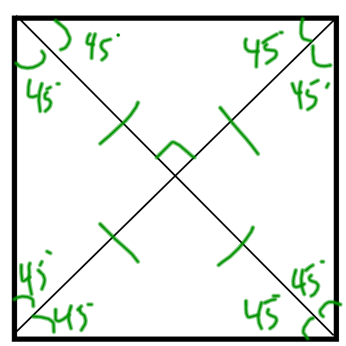


1. If rhombus, then ▱

2. If rhombus, then diags. $\perp$

3. If rhombus, then diags. bis. opp. $\angle$s.

Properties of Squares



1. If square, then ▱

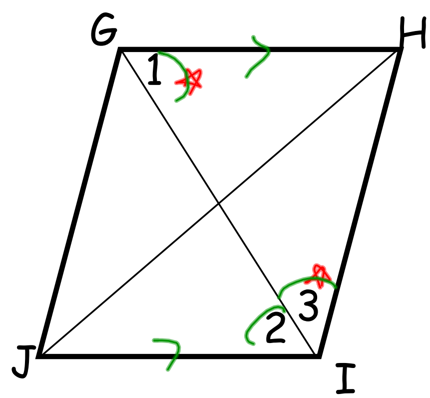
2. If square, then diags. $\cong$

3. If square, then diags. $\perp$

4. If square, then diags. bis. opp. $\angle$s

Given: GHIJ is a rhombus

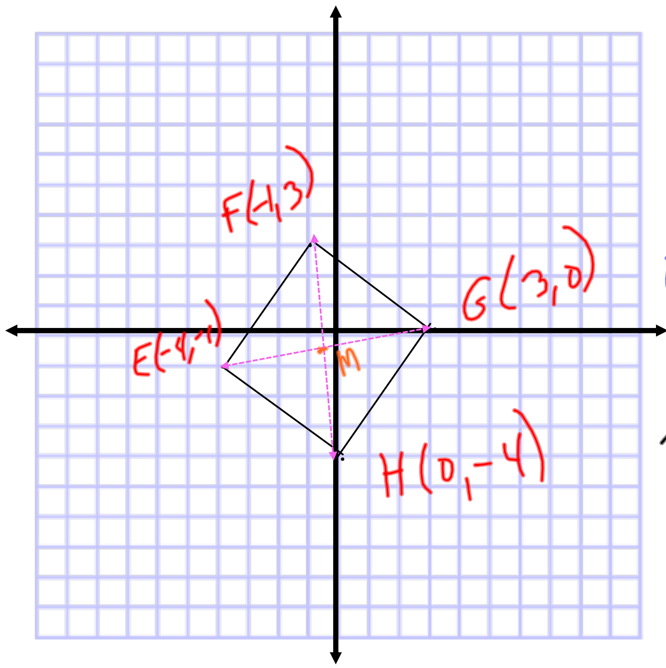
Prove: $\angle 1 \cong \angle 3$



Statement	Reason
1. GHIJ is rhombus	1. given
2. GHIJ is ▱	2. If rhombus → ▱
3. $\overline{GH} \parallel \overline{JI}$	3. defn ▱
4. $\measuredangle 1 \cong \measuredangle 2$	4. Alt. Int. $\measuredangle$s Thm
5. $\measuredangle 2 \cong \measuredangle 3$	5. If rhomb → diags bis opp $\measuredangle$s
6. $\measuredangle 1 \cong \measuredangle 3$	6. transitive prop. $\cong$

4. Show that the diagonals of square EFGH are congruent perpendicular bisectors of each other.

E(-4,-1), F(-1,3), G(3,0), H(0,-4)



Congruent: Distance Formula

$FH = \sqrt{(0+1)^2+(-4-3)^2} = \sqrt{1+49} = \sqrt{50}$

$= \sqrt{25 \cdot 2} = 5\sqrt{2}$

$EG = \sqrt{(3+4)^2+(0+1)^2} = \sqrt{49+1} = 5\sqrt{2}$

$\overline{FH} \cong \overline{EG}$

$\perp$: Slopes

$\overline{FH}$: $m = \frac{7}{-1} = -7$

$\overline{EG}$: $m = \frac{1}{7}$

$\perp$

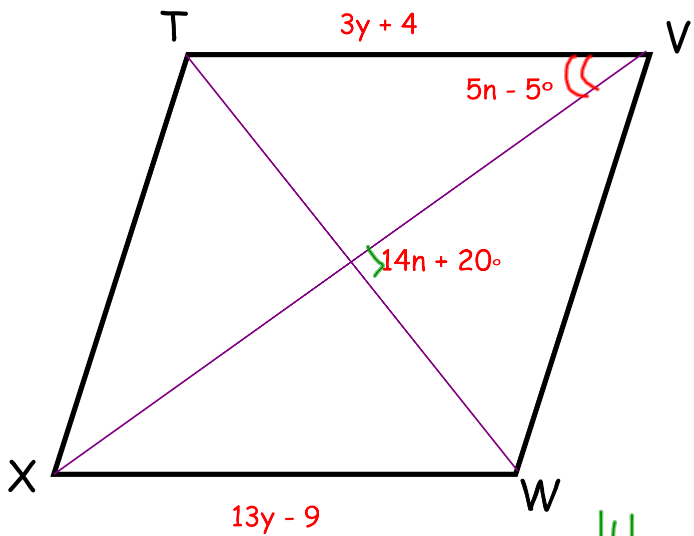
Bisectors: Midpt

$\overline{FH}$: $M\left(\frac{-1+0}{2}, \frac{3+-4}{2}\right) = M\left(\frac{-1}{2}, \frac{-1}{2}\right)$

$\overline{EG}$: $M\left(\frac{-4+3}{2}, \frac{-1+0}{2}\right) = M\left(\frac{-1}{2}, \frac{-1}{2}\right)$

Since diags have same midpt, they are bisectors of each other.

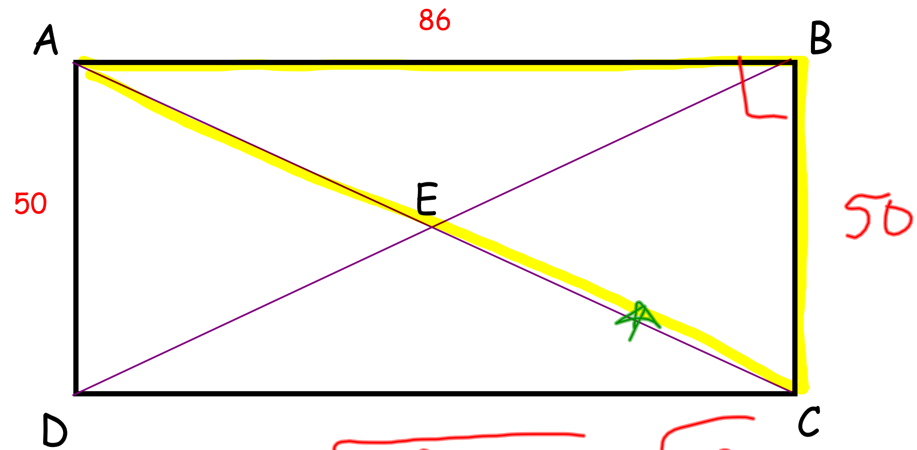
3. TVWX is a rhombus. Find each measure.



$$3y+4=13y-9$$
$$-3y+9 \quad -3y+9$$
$$\frac{13}{10}=\frac{10y}{10}$$
$$\boxed{1.3=y}$$

$$14n+20=90$$
$$\frac{14n}{14}=\frac{70}{14}$$
$$n=\frac{35}{7}$$
$$\boxed{n=5}$$

2. ABCD is a rectangle. Find EC.

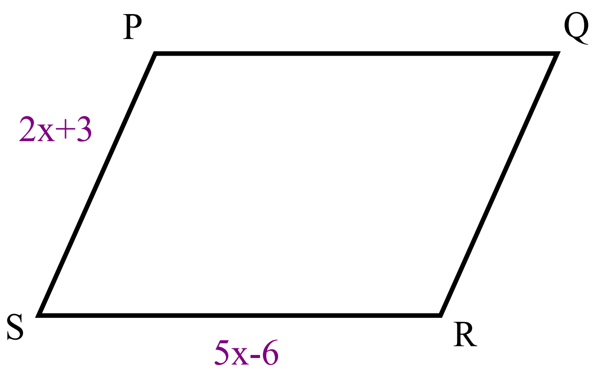


$$\sqrt{86^2+50^2} = \sqrt{c^2}$$

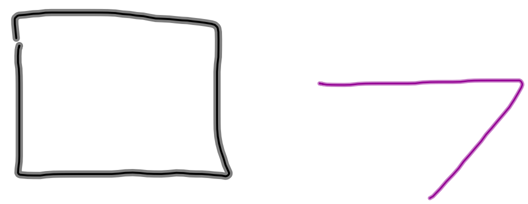
$$AC = 99.5 \approx c$$

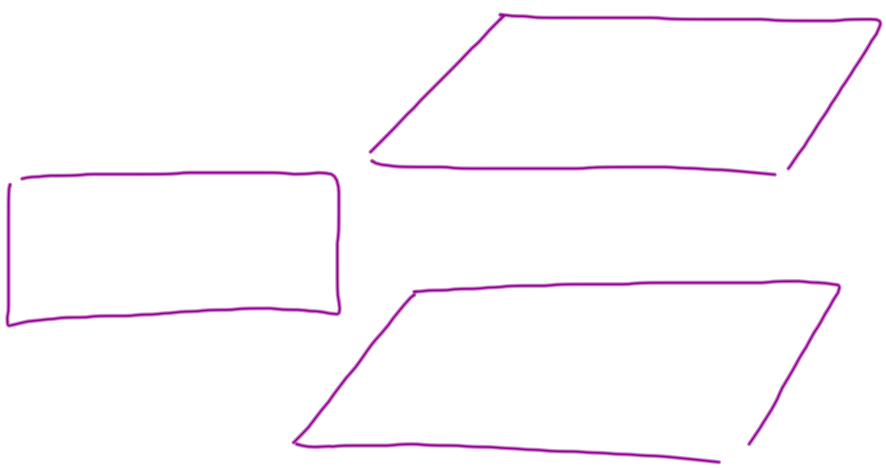
$$EC = \frac{1}{2}AC = \boxed{49.73}$$

1. PQRS is a rhombus. Find x.



$$2x+3=5x-6$$
$$-2x\ +6\quad -2x\ +6$$
$$9=3x$$
$$3=x$$





$\boxed{(6.4)\ 10\text{-}22\ ev,\ 24\text{-}31,\ 35,\ 36,\ 38,\ 41,\ 42,\ 48}$

Given: RSTU is a ▱
$\overline{SU} \perp \overline{RT}$

Prove: $\angle STR \cong \angle UTR$