

Geometry CC – Mr. Valentino
 Unit 9 Lesson 3: Squares and Rhombuses



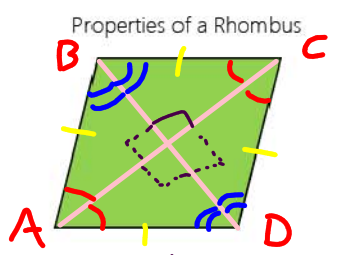
Name: _____
 Date: _____ Per: _____

Aim: What are the properties of squares and rhombuses?

Do Now: List the 5 properties of a parallelogram (try it without looking at your notes):

1. opposite sides are //
2. diagonals bisect each other
3. consecutive \angle 's are supp.
4. opposite sides are \cong
5. opposite \angle 's are \cong

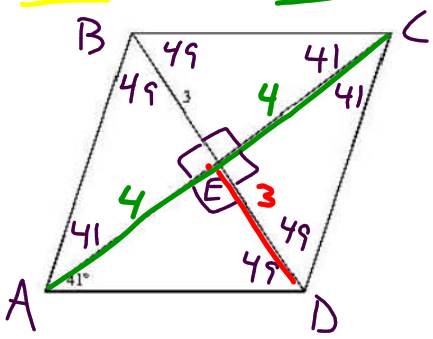
★ One more thing! What is the special quality that a rectangle has?
the diagonals are \cong



1. A rhombus has all the properties of a parallelogram ★
- ★ 2. A rhombus has 4 congruent sides
- ★ 3. The diagonals of a rhombus are perpendicular
- ★ 4. The diagonals of a rhombus bisect angles

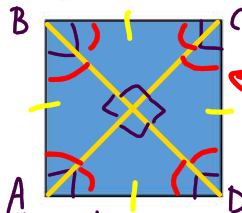
1. Add as many measurements to this rhombus as you can, if the longer diagonal measures 8 units.

- $\angle A = 82$
- $\angle C = 82$
- $\angle B = 98$
- $\angle D = 98$



$\overline{ED} = 3$

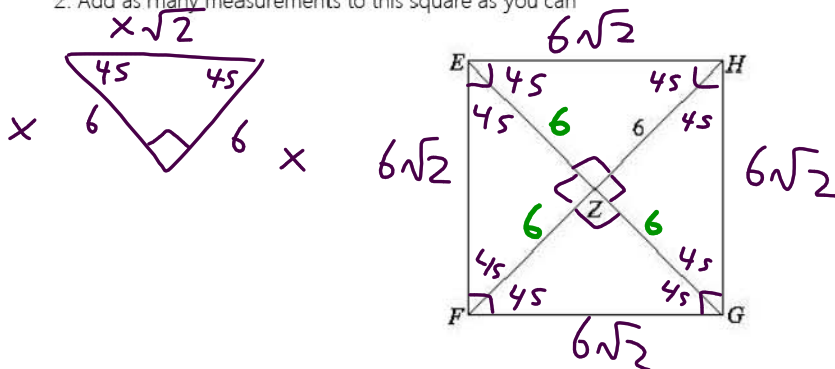
Properties of a Square



$\hookrightarrow 45^\circ$
angle

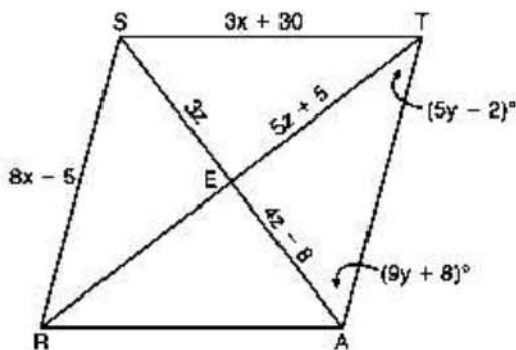
1. A square has all the properties of a rhombus \rightarrow parallelogram ALSO
2. A square has 4 \cong sides, 4 right \angle 's
3. The diagonals of a square are \star congruent / perpendicular
4. The diagonals of a square bisect angles

2. Add as many measurements to this square as you can



Practice Problems

1. In the diagram below, quadrilateral STAR is a rhombus with diagonals SA and TR intersecting at E. $ST = 3x + 30$, $SR = 8x - 5$, $SE = 3z$, $TE = 5z + 5$, $AE = 4z - 8$, $m\angle RTA = 5y - 2$, and $m\angle TAS = 9y + 8$. Find SR, RT, and $m\angle TAS$.



2. $ABCD$ is a parallelogram, with $AB = 2x + 1$, and $DC = 3x - 11$.

a) Find x .

b) Find AB and DC .

c) If $AD = x + 13$, why is $ABCD$ a rhombus?

3. $PQRS$ is a rhombus. The shorter diagonal \overline{PR} measures 12 units and $m\angle PQR = 60$. Find the length of each side of the rhombus.

4. In rhombus $ABCD$, the diagonals \overline{AC} and \overline{BD} intersect at E . If $AE = 5$ and $BE = 12$, what is the length of \overline{AB} ?

1. 7
2. 10
3. 13
4. 17

5. The length of a side of a square is 5. In simplest radical form, find the length of a diagonal of the square.

1. $2\sqrt{5}$
2. 5
3. $5\sqrt{2}$
4. 10

6. A parallelogram *must* be a rhombus if the

1. diagonals are perpendicular
2. opposite angles are congruent
3. diagonals are congruent
4. opposite sides are congruent

7. $ABCD$ is a rhombus with diagonals \overline{AC} and \overline{BD} intersecting at E . Which of these **must** be true? (circle all that apply)

- (1) $\overline{AB} \cong \overline{DC}$ (3) $\overline{AB} \cong \overline{BC}$
 (2) $\overline{AB} \cong \overline{AC}$ (4) $\overline{AB} \cong \overline{AD}$

8. $ABCD$ is a rhombus with diagonals \overline{AC} and \overline{BD} intersecting at E . Which of these **must** be true? (circle all that apply)

- (1) $AE = EC$ (3) $DE = EB$
 (2) $AE = DE$ (4) $\overline{AC} \perp \overline{DE}$

9. $ABCD$ is a rhombus with diagonals \overline{AC} and \overline{BD} intersecting at E . Which of these **must** be true? (circle all that apply)

- (1) $\triangle ADC$ is isosceles (3) $\triangle ADE$ is a right triangle
 (2) $\triangle ADB$ is a right triangle (4) $\triangle ADE \cong \triangle ABE$

10. $ABCD$ is a rhombus with diagonals \overline{AC} and \overline{BD} intersecting at E . Which of these **must** be true? (circle all that apply)

- (1) $\overline{AC} \perp \overline{DB}$ (3) $\overline{AC} \cong \overline{DB}$
 (2) $\angle DAB \cong \angle DCB$ (4) $\angle ADB \cong \angle CDB$

11. What is the perimeter of a square whose diagonal is $3\sqrt{2}$?

12. In square $ABCD$ diagonal AC is drawn. How many degrees are in there in the measure of $\angle ACB$?