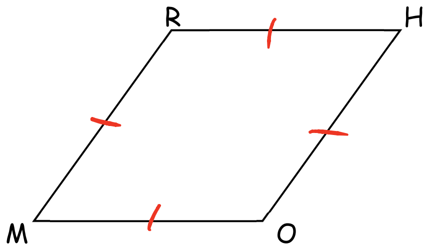
Quadrilaterals – Squares and Rhombi

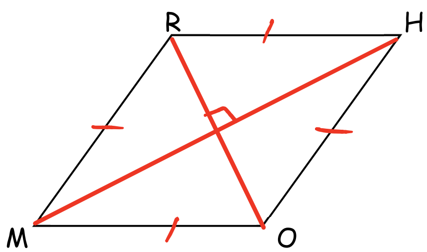
Notes Section 6.5

Name________________

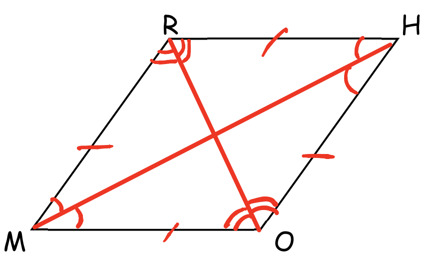
Rhombus:
A quadrilateral with four congruent sides. (Also could be defined as a parallelogram with four congruent sides.)



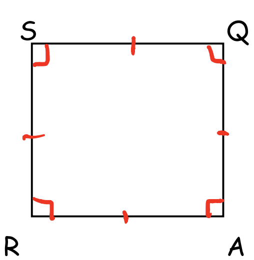
Theorem 6-13.14:
A quadrilateral is a rhombus IFF its diagonals are perpendicular.



Theorem 6-15:
Each diagonal of a rhombus bisects a pair of opposite angles.



Square:
(a rectangular rhombus; a rhombicular rectangle.) A quadrilateral that is both a rhombus and a rectangle.



Name all the quadrilaterals – parallelogram, rectangle, rhombus, or square – that have each property.

#1) The opposite sides are parallel.

All

#2) The opposite sides are congruent.

All

#3) All sides are congruent.

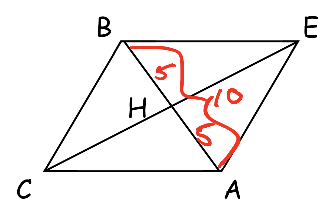
Rhombus, Square

#4) It is equiangular and equilateral.

Square

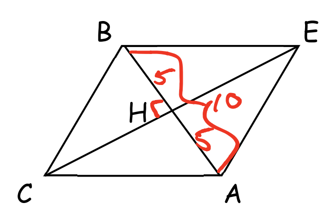
Use rhombus BEAC with BA = 10 to determine whether each statement is true or false. Justify your answer.

#5) CE = 10



False, the digonals of a rhombus do not have to be congruent.

#6) $\overline{CE} \perp \overline{AB}$



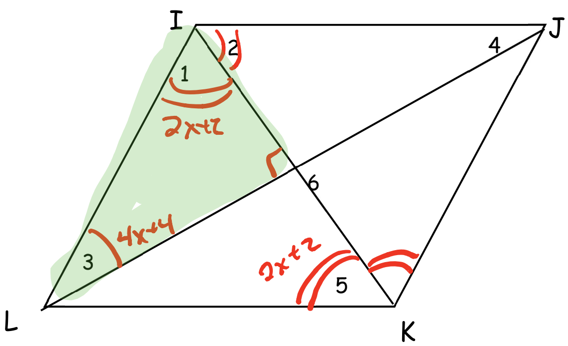
True, the diagonals of a rhombus are perpendicular.

Quadrilaterals – Squares and Rhombi

Notes Section 6.5 Name________________

Use rhombus IJKL and the given information to solve each problem.

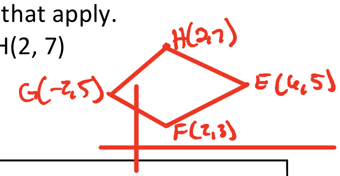
#7) If m∠3 = 4(x + 1) and m∠5 = 2(x + 1), find x.



$$(2x+2)+(4x+4)+90=180$$
$$6x+96=180$$
$$6x=84$$
$$x=14$$

Determine whether EFGH is a parallelogram, rectangle, rhombus, or square. List all that apply.

#8) E(6, 5), F(2, 3), G(-2, 5), H(2, 7)



To determine if a quad is a parallelogram.	The diagonals must have the same midpoint.
To determine if a quad is a rectangle.	The midpoints of the diagonals must be the same and the diagonals must have the same length.
To determine if a quad is a rhombus.	The midpoints of the diagonals must be the same and the diagonals must be perpendicular
To determine if a quad is a square.	The quad must be a rectangle and a rhombus.

Parallelogram ✓ $M_{\overline{GE}} = M_{\overline{FH}}$

$M_{\overline{GE}} = \left(\frac{\Sigma x}{2}, \frac{\Sigma y}{2}\right) = \left(\frac{(-2)+(6)}{2}, \frac{(5)+(5)}{2}\right) = \left(\frac{4}{2}, \frac{10}{2}\right)$

$M_{\overline{GE}} = (2,5)$

$M_{\overline{FH}} = \left(\frac{\Sigma x}{2}, \frac{\Sigma y}{2}\right) = \left(\frac{(2)+(2)}{2}, \frac{(7)+(3)}{2}\right) = \left(\frac{4}{2}, \frac{10}{2}\right)$

$M_{\overline{FH}} = (2,5)$

Rectangle ✗ $GE = FH$

$GE = \sqrt{[\Delta x]^2 + [\Delta y]^2}$
$= \sqrt{[(-2)-(6)]^2 + [(5)-(5)]^2}$
$= \sqrt{[-8]^2 + [0]^2}$
$= \sqrt{64+0}$
$= \sqrt{64}$
$GE = 8$

$FH = \sqrt{[\Delta x]^2 + [\Delta y]^2}$
$= \sqrt{[(2)-(2)]^2 + [(7)-(3)]^2}$
$= \sqrt{[0]^2 + [4]^2}$
$= \sqrt{0+16}$
$= \sqrt{16}$
$FH = 4$

Rhombus ✓ $\overline{GE} \perp \overline{FH}$

$m_{\overline{GE}} = \frac{\Delta y}{\Delta x} = \frac{(5)-(5)}{(-2)-(6)} = \frac{0}{-8}$

$m_{\overline{GE}} = 0$

Horizontal

$m_{\overline{FH}} = \frac{\Delta y}{\Delta x} = \frac{(7)-(3)}{(2)-(2)} = \frac{-4}{0}$

$m_{\overline{FH}} =$ undefined

vertical