Geometry – Mr. Bo
Unit 6 – Day 3 Notes

Name: ______________________
Date: ______________

Proving Parallelograms & Special Parallelograms

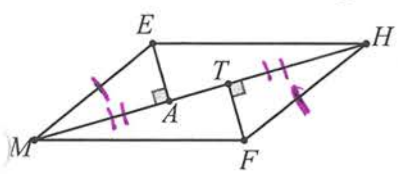
The 4 **BEST** ways to prove a Quadrilateral is a Parallelogram:

1. Opposite sides are //
2. opposite sides are $\cong$
3. Diagonals bisect each other
4. ✱ 1 pair sides // and $\cong$ ✱

Example:

Given: $\overline{ME} \cong \overline{HF}$
$\angle EAM$ & $\angle HTF$ are right
$\overline{MA} \cong \overline{HT}$

Prove: MEHF is a Parallelogram



for opp. sides $\cong$ or //
need to get
$\triangle EAH \cong \triangle FTM$

OR

for 1 pair of sides $\cong$ and //
we need to get
$\triangle MEA \cong \triangle HFT$

easier to do.

Statements	Reasons.
① $\overline{ME} \cong \overline{HF}$ $\angle EAM$ and $\angle HTF$ rt $\angle$'s. $\overline{MA} \cong \overline{HT}$	① Given
② $\triangle MEA \cong \triangle HFT$	② HL.
③ $\angle EMH \cong \angle FHM$	③ CPCTC.
④ $\overline{ME}$ // $\overline{HT}$	④ 2 lines cut by a trans are // when alt int $\angle$'s are $\cong$.
⑤ //-ogram MEHF	⑤ Quad. with 1 pair of sides // and $\cong$ is a //-ogram.

How to prove a Rectangle:

A Quadrilateral With...

$4 \cong \angle$'s.

(4 Rt $\angle$'s)

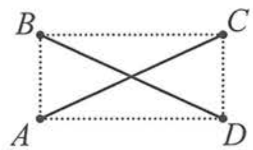
OR

A Parallelogram With...

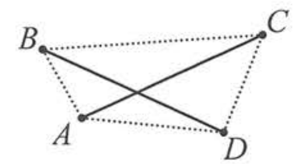
- One Rt $\angle$.

or

- $\cong$ Diagonals.



Rectangle
(//-ogram)

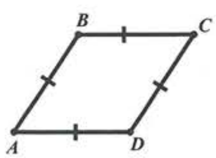


Not a Rectangle
(not a //-ogram)

How to prove a Rhombus:

A Quadrilateral With...

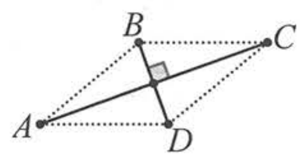
$4 \cong$ sides.



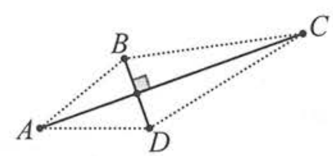
OR

A Parallelogram With...

$\perp$ Diagonals.

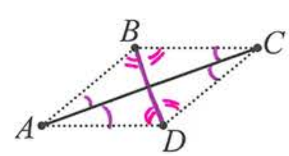


Rhombus
(//-ogram)

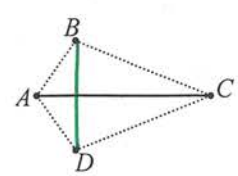


Not a Rhombus
(Not a //-ogram)

Diagonals that bisect the $\angle$'s.

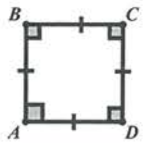


Rhombus
(//-ogram)

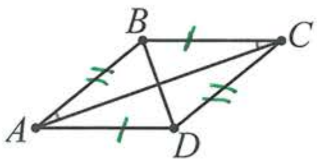


Not a Rhombus
(Not a //-ogram)

How to prove a Square:

A Quadrilateral With...		A Rectangle With...
4 ≅ ∠'s and 4 ≅ sides.	OR	4 ≅ sides or ⊥ Diagonals.
		**A Rhombus With...**
		4 ≅ ∠'s or ≅ Diagonals.

Example:
Given: Parallelogram ABCD
$\angle BAC \cong \angle BCA$
Prove: ABCD is a Rhombus



Statements	Reasons.
① //-ogram ABCD $\angle BAC \cong \angle BCA$	① Given
② $\overline{BC} \cong \overline{DA}$ $\overline{AB} \cong \overline{CD}$	② opp. sides //-ogram are ≅.
③ $\overline{AB} \cong \overline{CB}$	③ in a △, sides opp. ≅ ∠'s are ≅.
④ $\overline{CB} \cong \overline{CD} \cong \overline{AD} \cong \overline{AB}$	④ transitive.