Name: Key

Date: ______

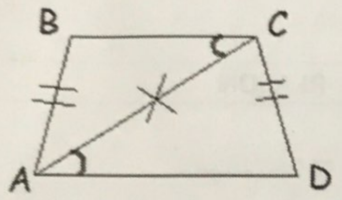
UNIT 3

LESSON 5

AIM: HOW DO WE COMPLETE PROOFS USING THE HL POSTUALTE?

Do Now: State whether or not the triangles can be proved congruent. If yes, state the congruency method.

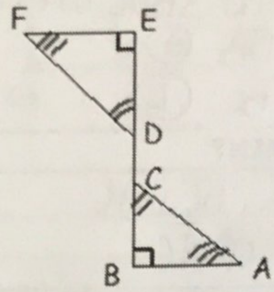
(a)



Not ≅!

SSA

(b)



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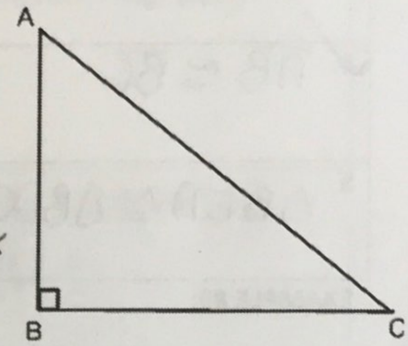
RULE: In order to prove triangles are congruent using HL, you must first prove that you have right **triangles.**

KEY STATEMENTS:

STATEMENT	REASON
∡ABC is a right ∡	⊥ lines form right ∡'s
ΔABC is a right Δ	Right Δ's have 1 right ∡

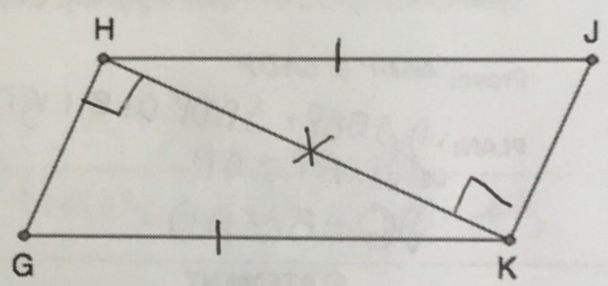


EXAMPLE #1:

Given: $\overline{GH} \perp \overline{HK}, \overline{JK} \perp \overline{KH}, \overline{GK} \cong \overline{JH}$

Prove: $\Delta GHK \cong \Delta JKH$

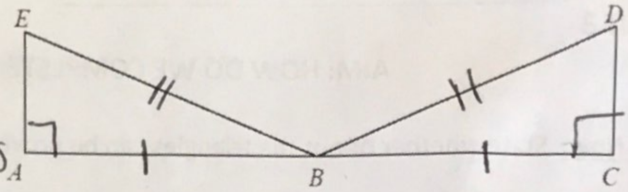
PLAN: 1) Δ GHK & ΔJKH are right Δ's
2) (H) $\overline{GK} \cong \overline{JH}$
3) (L) $\overline{HK} \cong \overline{HK}$



STATEMENT	REASON
1. $\overline{GH} \perp \overline{HK}, \overline{JK} \perp \overline{KH}, \overline{GK} \cong \overline{JH}$	1. Given
2. ∡GHK & ∡JKH are right ∡'s	2. Perpendicular lines form right angles.
3. ΔGHK and ΔJKH are right triangles.	3. Right Δ's have 1 right ∡
4. ΔGHK ≅ ΔJKH	4. $HL \cong HL$

EXAMPLE #2:

Given: $\overline{EB} \cong \overline{DB}, \overline{EA} \perp \overline{AC}, \overline{DC} \perp \overline{AC}$,
B *is the midpoint of* $\overline{AC}$
Prove: $\Delta BEA \cong \Delta BDC$



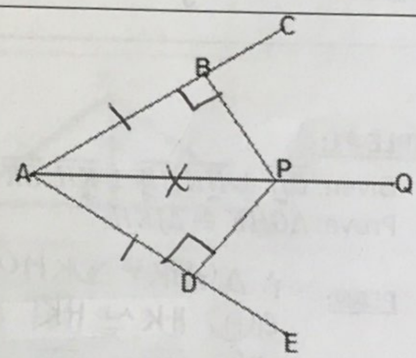
PLAN: 1) ΔBEA and ΔBDC are right Δ's
2) EB ≅ DB (H)
3) AB ≅ BC (L)

STATEMENT	REASON
1. $\overline{EB} \cong \overline{DB}$, $\overline{EA} \perp \overline{AC}$, $\overline{DC} \perp \overline{AC}$ B is the midpoint of $\overline{AC}$	1. Given
2. ∡A and ∡C are right ∡'s	2. Perpendicular lines form right angles.
3. ΔBEA + ΔBDC are right Δ's	3. Right triangles have one right ∡.
4. $\overline{AB} \cong \overline{BC}$	4. A midpoint creates two congruent segments.
5. ΔBEA ≅ ΔBDC	5. $HL \cong HL$

EXAMPLE #3:

Given: $\overline{PB} \perp \overline{AC}$, $\overline{PD} \perp \overline{AE}$, $\overline{AB} \cong \overline{AD}$

Prove: $\Delta ABP \cong \Delta ADP$



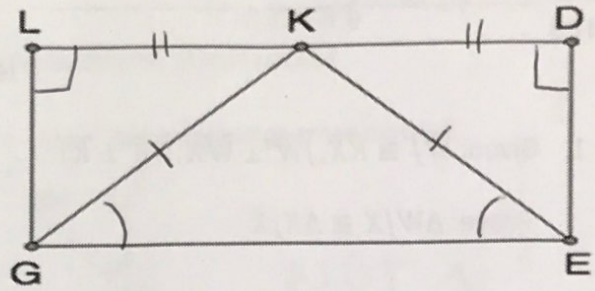
PLAN: 1) ΔABP + ΔADP are right Δ's
2) (H) AP ≅ AP
3) (L) AB ≅ AD

STATEMENT	REASON
1. $\overline{PB} \perp \overline{AC}$, $\overline{PD} \perp \overline{AE}$, $\overline{AB} \cong \overline{AD}$	1. Given
2. $\measuredangle ABP$ *and* $\measuredangle ADP$ are right angles. 2.5) ΔABP + ΔADP are right Δ's	2. ⊥ lines form right ∡'s 2.5) Right Δ's have 1 right ∡
3. $\overline{AP} \cong \overline{AP}$	3. Reflexive postulate
4. ΔABP ≅ ΔADP	4. HL ≅ HL

EXAMPLE #4:

Given: $\angle KGE \cong \angle KEG$, $\overline{GL} \perp \overline{LD}$, $\overline{ED} \perp \overline{DL}$ and K is the midpoint of $\overline{LD}$

Prove: $\Delta KLG \cong \Delta KDE$



PLAN: 1) ΔKLG and ΔKDE are right Δ's

2) (H) $\overline{KG} \cong \overline{KE}$

3) (L) $\overline{LK} \cong \overline{KD}$

STATEMENT	REASON
1. ∡KGE ≅ ∡KEG, $\overline{GL} \perp \overline{LD}$, $\overline{ED} \perp \overline{DL}$ & K is the midpoint of $\overline{LD}$	1. Given
2. ✓ $\overline{LK} \cong \overline{KD}$	2. A midpoint creates two congruent segments.
3. ΔGKE is an isosceles triangle	3. Isosceles Δ's have 2 ≅ base angles
4. ✓ $\overline{KG} \cong \overline{KE}$	4. Isosceles triangles have two congruent sides.
5. $\measuredangle GLK$ and $\measuredangle EDK$ are right angles.	5. ⊥ lines form right ∡'s
6. ΔGLK and ΔEDK are right triangles.	6. Right Δ's have 1 right ∡
7. ΔKLG ≅ ΔKDE	7. HL ≅ HL

Name: Kly

Date: ______________

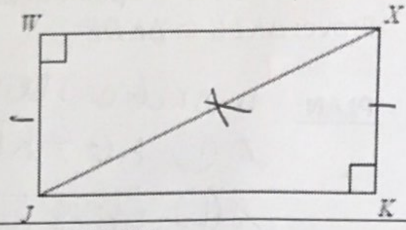
UNIT 3

LESSON 5

HOMEWORK

1. Given: $\overline{WJ} \cong \overline{KX}, \overline{JW} \perp \overline{WX}, \overline{XK} \perp \overline{KJ}$

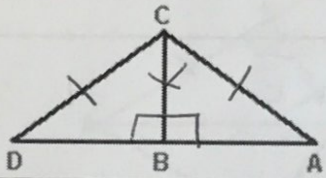
   Prove: $\Delta WJX \cong \Delta KJX$



STATEMENT	REASON
1. $\overline{WJ} \cong \overline{KX}$, $\overline{JW} \perp \overline{WX}$, $\overline{XK} \perp \overline{KJ}$	1. Given
2. $\measuredangle W$ and $\measuredangle K$ are right angles.	2. ⊥ lines form right ∡'s
3. ΔWJX and ΔKJX are right Δ's	3. Right triangles have one right angle.
4. $\overline{JX} \cong \overline{JX}$	4. Reflexive postulate
5. $\Delta WJX \cong \Delta KJX$	5. HL ≅ HL

2. Given: $\overline{CB} \perp \overline{DA}$ and $\overline{DC} \cong \overline{AC}$

   Prove: $\Delta DCB \cong \Delta ACB$



STATEMENT	REASON
1. $CB \perp \overline{DA}$ and $\overline{DC} \cong \overline{AC}$	1. Given
2. ∡ CBD and ∡ CBA are right ∡'s	2. Perpendicular lines form right angles.
3. ΔDCB and ΔACB are right triangles.	3. Right Δ's have 1 right ∡
4. $\overline{CB} \cong \overline{CB}$	4. Reflexive Property
5. $\Delta DCB \cong \Delta ACB$	5. HL ≅ HL