

# 8.1 Hypotenuse-Leg (HL) Theorem

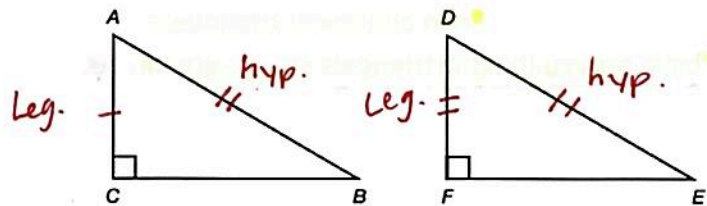
**Hypotenuse-Leg (HL) Congruence Theorem:** "If the hypotenuse and leg of one right triangle are congruent to the hypotenuse and leg of another right triangle, then the triangles are congruent."

Given:  $\angle C$  and  $\angle F$  are right angles

$$\overline{AC} \cong \overline{DF}$$

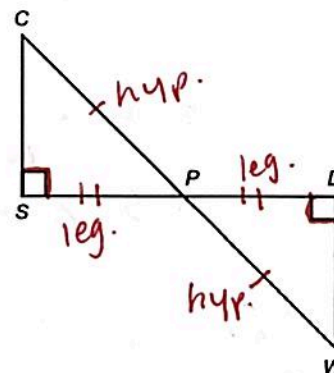
$$\overline{AB} \cong \overline{DE}$$

Prove:  $\triangle ABC \cong \triangle DEF$



Determine if there is enough information to prove that the two triangles are congruent. If so, name the congruence theorem used.

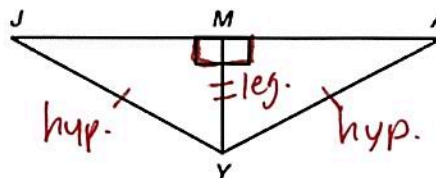
If  $\overline{CS} \perp \overline{SD}$ ,  $\overline{WD} \perp \overline{SD}$ , and  $P$  is the midpoint of  $\overline{CW}$  and  $\overline{SD}$ , is  $\triangle CSP \cong \triangle WDP$ ?



yes, HL

If  $\overline{JA} \perp \overline{MY}$  and  $\overline{JY} \cong \overline{AY}$ , is  $\triangle JYM \cong \triangle AYM$ ?

yes, HL

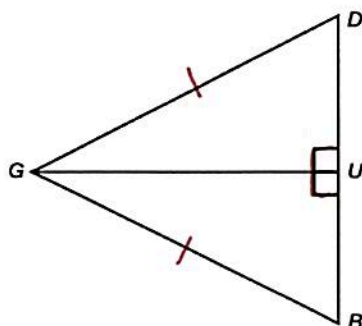


Create a proof of the following.

Given:  $\overline{GU} \perp \overline{DB}$

$$\overline{GB} \cong \overline{GD}$$

Prove:  $\triangle GUD \cong \triangle GUB$



Statements	Reasons
1. $\overline{GU} \perp \overline{DB}$	1. Given
2. $\overline{GB} \cong \overline{GD}$	2. "
3. $\angle GUD \cong \angle GUB$	3. Def. $\perp$ lines
4. $\overline{GU} \cong \overline{GU}$	4. Reflexive
5. $\triangle GUD \cong \triangle GUB$	5. HL Congruence

## 8.2 CPCTC

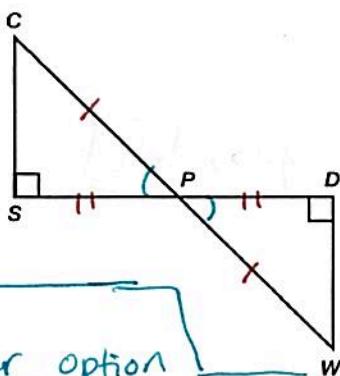
**Corresponding parts of congruent triangles are congruent:** If two triangles are congruent, then each part of one triangle is congruent to the corresponding part of the other triangle.

Abbreviated as CPCTC, it is often used as a reason in proofs. CPCTC states that corresponding angles or sides in two congruent triangles are congruent. This reason can only be used after you have proven that the triangles are congruent. ✱

Create a proof of the following.

Given:  $\overline{CW}$  and  $\overline{SD}$  bisect each other

Prove:  $\overline{CS} \cong \overline{WD}$



other option  
4.  $\angle CPS \cong \angle WPD \rightarrow$  4. vertical  $\angle$ 's  
5.  $\triangle CPS \cong \triangle WPD \rightarrow$  5. SAS

Statements

1.  $\overline{CW}$  and  $\overline{SD}$  bisect each other.

2.  $\overline{CP} \cong \overline{WP}$

3.  $\overline{SP} \cong \overline{DP}$

✱ 4.  $\angle S \cong \angle D$  and  $90^\circ \angle$ 's

✱ 5.  $\triangle CPS \cong \triangle WPD$

6.  $\overline{CS} \cong \overline{WD}$

Reasons

1. Given

2. Def. of seg. bisector

3. " "

4. Given

5. HL congruence

6. CPCTC

Statements

1.  $\overline{SU} \cong \overline{SK}$

2.  $\overline{SR} \cong \overline{SH}$

3.  $\angle S \cong \angle S$

4.  $\triangle SHU \cong \triangle SRK$

5.  $\angle U \cong \angle K$

Reasons

1. Given

2. "

3. Reflexive

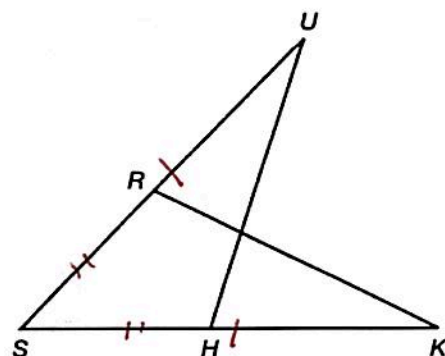
4. SAS

5. CPCTC

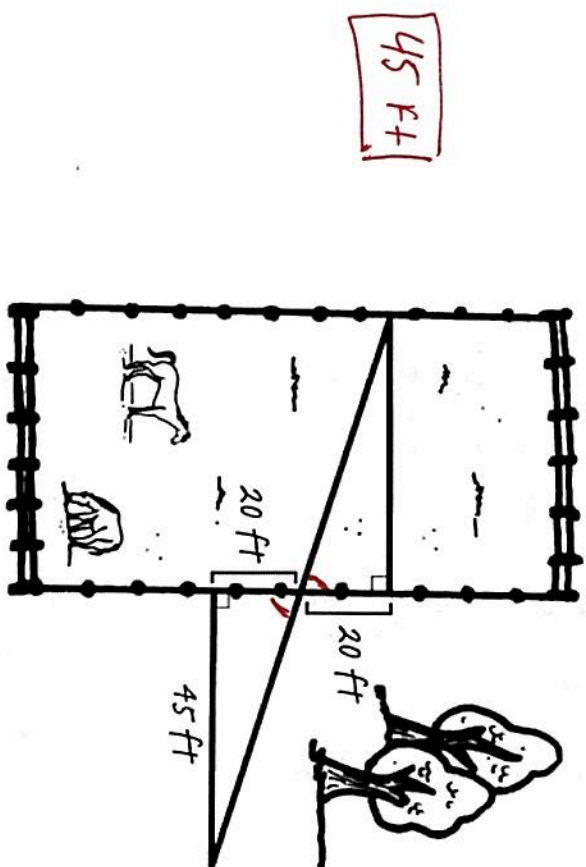
Create a proof of the following.

Given:  $\overline{SU} \cong \overline{SK}$ ,  $\overline{SR} \cong \overline{SH}$

Prove:  $\angle U \cong \angle K$

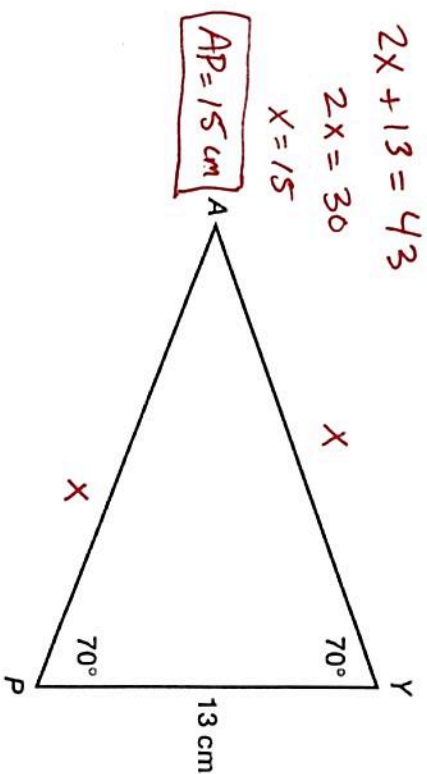


1. How wide is the horse's pasture?



45 ft

2. Calculate AP if the perimeter of  $\triangle AYP$  is 43 cm.



$$2X + 13 = 43$$

$$2X = 30$$

$$X = 15$$

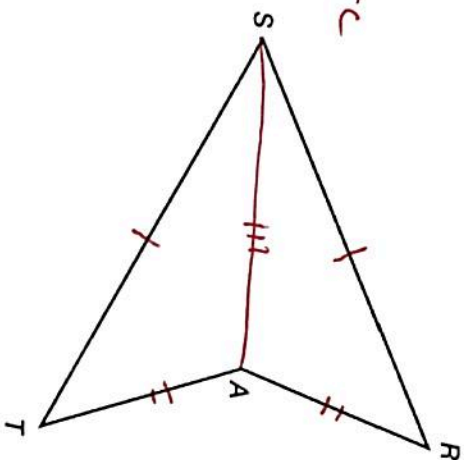
$$AP = 15 \text{ cm}$$

3. Given:  $\overline{ST} \cong \overline{SR}$ ,  $\overline{TA} \cong \overline{RA}$

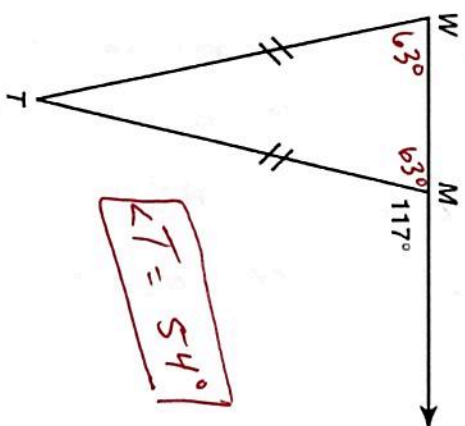
Explain why  $\angle T \cong \angle R$ .

$$\Delta S \cong \Delta R \text{ by SSS}$$

$$\angle T \cong \angle R \text{ by CPCTC}$$



4. Calculate  $m\angle T$ .

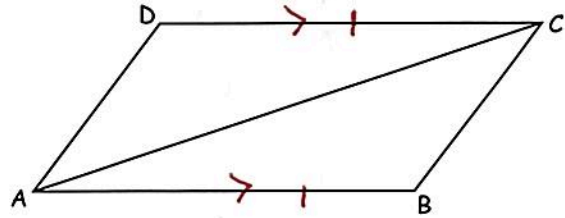


$$\angle T = 54^\circ$$

# PAP Geometry Notes

Given:  $\overline{AB} \parallel \overline{DC}$ ;  $\overline{AB} \cong \overline{CD}$

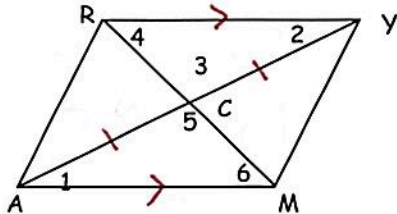
Prove:  $\triangle ABC \cong \triangle CDA$



Statements	Reasons
1. $\overline{AB} \parallel \overline{DC}$	1. Given
2. $\overline{AB} \cong \overline{DC}$	2. "
3. $\angle DCA \cong \angle ACB$ $\angle CAB \cong \angle CAD$	3. Alt. int. $\angle$ 's
4. $\overline{AC} \cong \overline{AC}$	4. Reflexive
5. $\triangle ABC \cong \triangle CDA$	5. SAS

Given:  $\overline{MA} \parallel \overline{RY}$ ;  $\overline{RM}$  bisects  $\overline{AY}$

Prove:  $\overline{RC} \cong \overline{MC}$



Statements	Reasons
1. $\overline{MA} \parallel \overline{RY}$	1. Given
2. $\overline{RM}$ bisects $\overline{AY}$	2. "
3. $\overline{AC} \cong \overline{CY}$	3. Def. seg. bisector
4. $\angle 3 \cong \angle 5$	4. vertical $\angle$ 's
5. $\angle 2 \cong \angle 1$	5. alt. int. $\angle$ 's
6. $\triangle RCY \cong \triangle MCA$	6. ASA
7. $\overline{RC} \cong \overline{MC}$	7. CPCTC