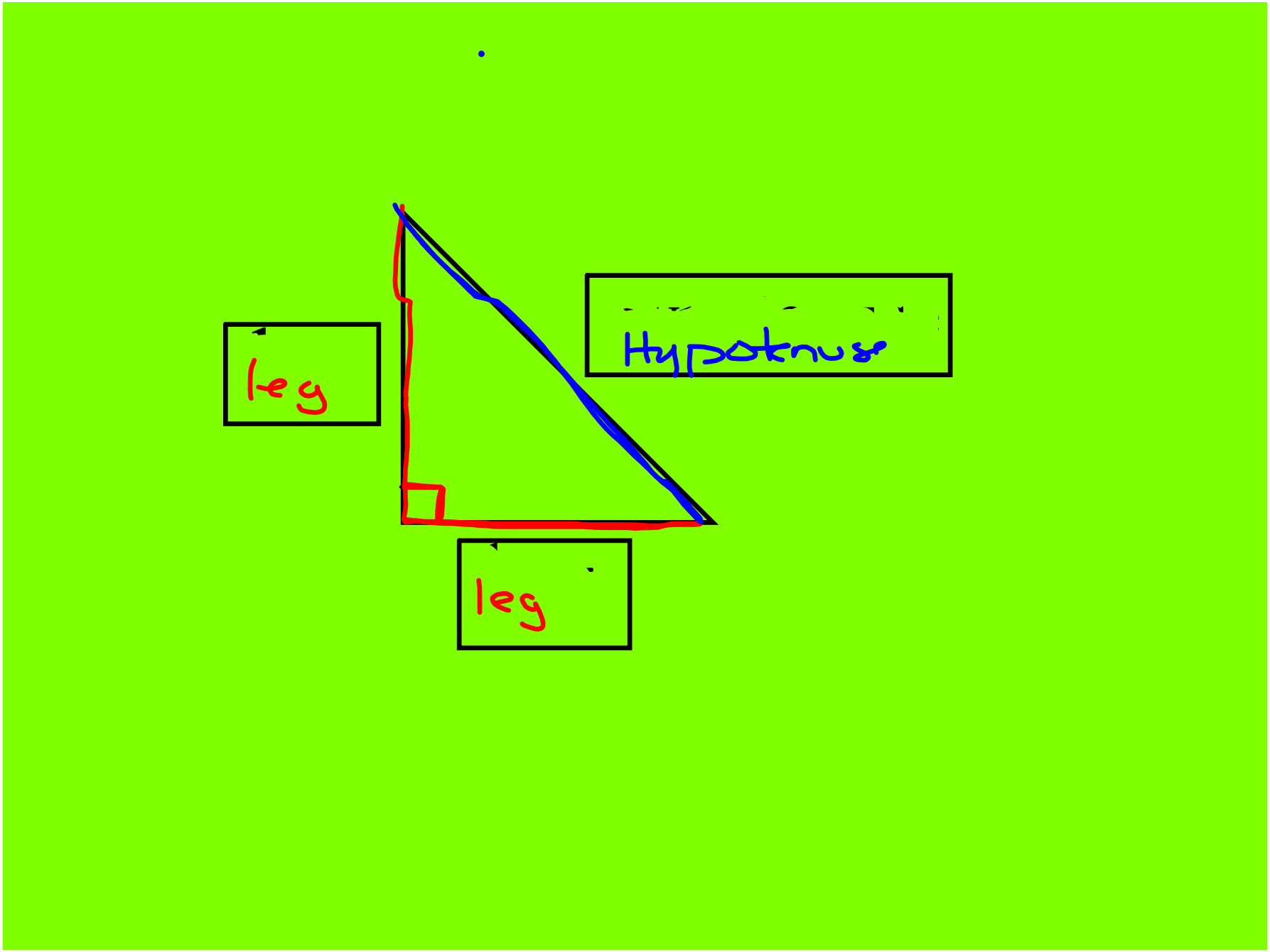
Geometry

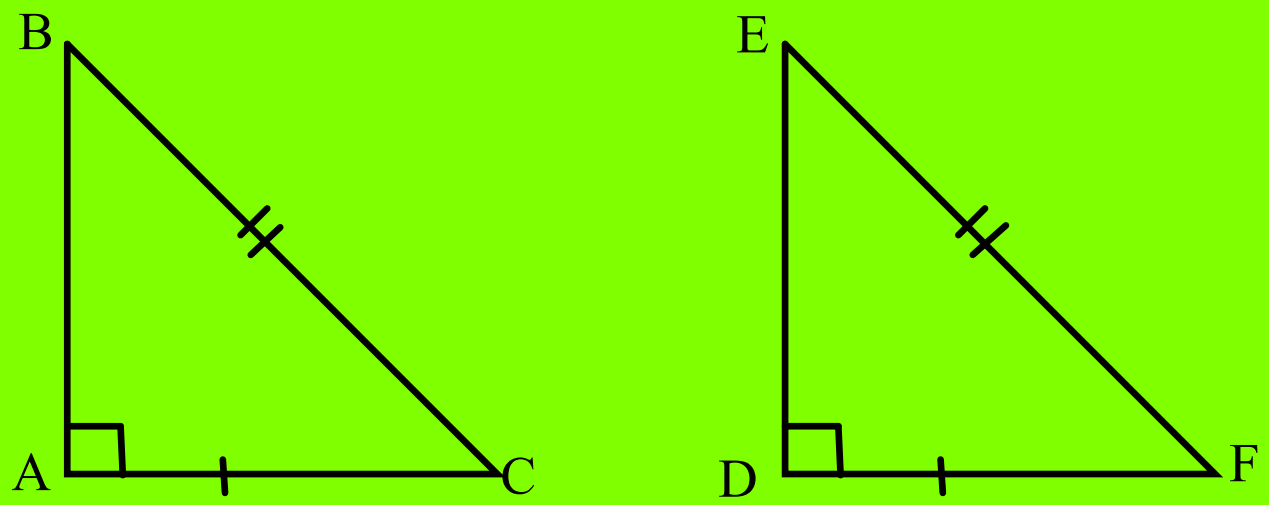
Ch. 4 Handout 4.6

Congruence in Right Triangles -- HL Theoren


leg
Hypotenuse
leg

Theorem 4.6 : Hypotenuse-Leg (HL) Theorem

If the hypotenuse and a leg of one right triangle are congruent to the hypotenuse and leg of another right triangle, then the triangles are congruent.



Three conditions to be able to use HL Theorem

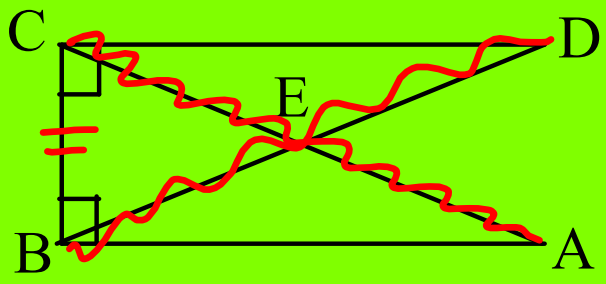
1. There are two right triangles. Pull

2. The triangles have congruent hypotenuse. Pull

3. There is one pair of congruent corresponding legs. Pull

1. Given: $\angle ABC$ and $\angle DCB$ are right angles, $\overline{AC} \cong \overline{DB}$

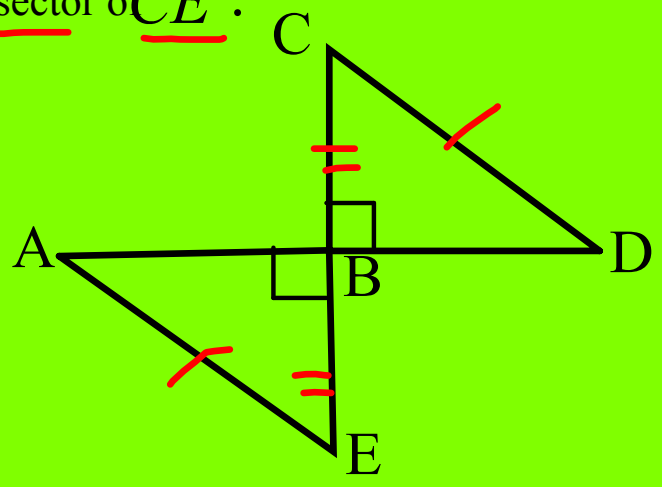
Prove: $\Delta ABC \cong \Delta DCB$



Statements	Reasons
① ∠ABC + ∠DCB are R+ ∠'s ; $\overline{AC} \cong \overline{DB}$	① Given
② △ABC and △DCB are Right △'s	② defn of Rt. △'s
③ $\overline{BC} \cong \overline{BC}$	③ Reflexive prop $\cong$
④ $\Delta ABC \cong \Delta DCB$	④ HL thm

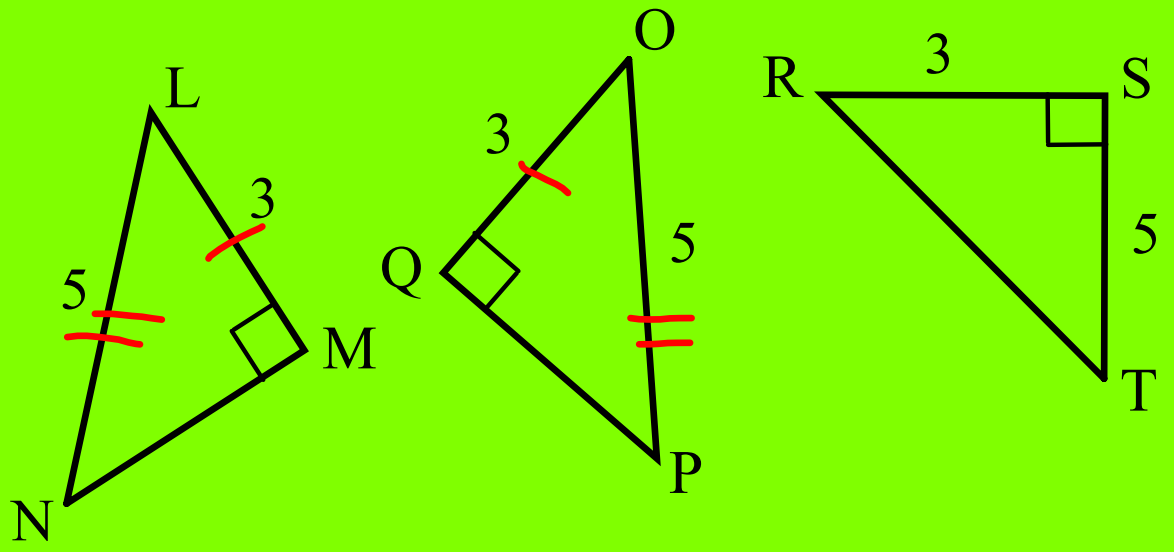
2. Given: $\overline{CD} \cong \overline{EA}$. $\overline{AD}$ is the perpendicular bisector of $\overline{CE}$.

Prove: $\Delta CBD \cong \Delta EBA$



Statements	Reasons
① $\overline{CD} \cong \overline{EA}$; $\overline{AD} \perp$ bisector $\overline{CE}$	① Given
② $\angle CBD$ & $\angle ABE$ are Rt $\angle$'s	② defn of $\perp$ lines
③ ΔCBD & ΔABC are Rt Δs	③ defn of Rt. Δs
④ $CB \cong BE$	④ defn $\perp$ bisector
⑤ $\Delta CBD \cong \Delta EBA$	⑤ HL thm

3. Which two triangles are congruent by the HL Theorem?



$\triangle LMN \cong \triangle OQP$ HL thm

For what values of x and y are the triangles congruent by HL?

x = -2
y = 2

$4y + x = y + 4$

$-y \qquad -y$

$3y + x = 4$

$3(2x + 6) + x = 4$

$6x + 18 + x = 4$

$7x + 18 = 4$

$-18 \quad -18$

$7x = -14$

$x = -2$

$y - x = x + 6$

$+x \quad +x$

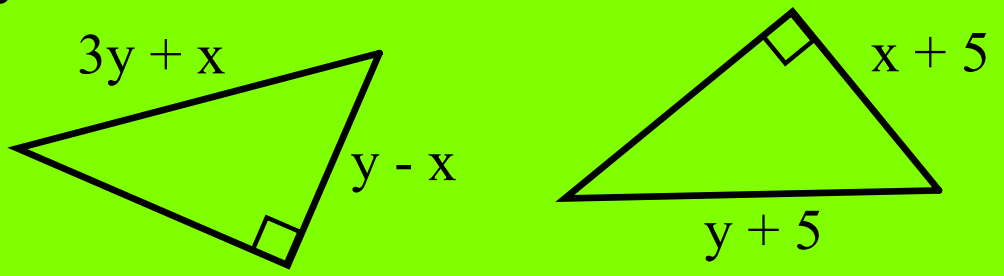
$y = 2x + 6$

$y = 2(-2) + 6$

$y = -4 + 6$

$y = 2$

Pg 238 Question 11 For what values of x and y are the triangles congruent by HL.



Assignments:

pgs 237-240 3,4,6-8,10,11,13,14,20,21