Homework : Prove ≅ △s by Hy Leg (Key back page)

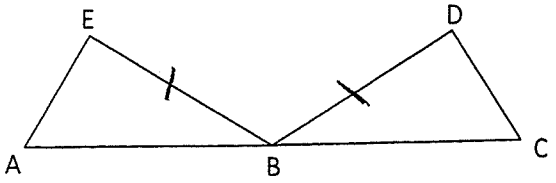
Now it's your turn. Use the notes and examples that you just read to guide you.

Do all proof on a separate sheet of paper.

1. Write a flow proof.

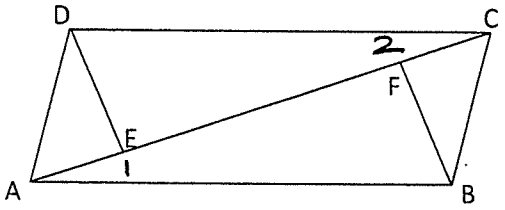
   Given: B is the midpoint $\overline{AC}$
   $\overline{BE} \perp \overline{AE}$; $\overline{BD} \perp \overline{DC}$
   $\overline{BE} \cong \overline{BD}$

   Prove: $\angle A \cong \angle C$



2. Use the diagram at the right and the given information to prove each of the following.

   Given: $\overline{DE} \perp \overline{AC}$; $\overline{BF} \perp \overline{AC}$
   $\overline{AB} \cong \overline{CD}$; $\overline{DE} \cong \overline{BF}$



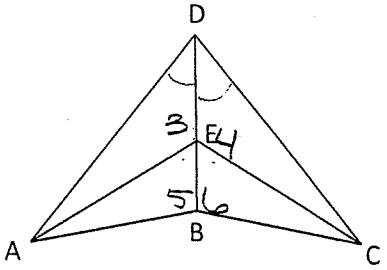
   a. Prove: $\angle 1 \cong \angle 2$

   b. Prove: $\overline{AD} \cong \overline{CB}$

   c. Prove: $\overline{AE} \cong \overline{CF}$

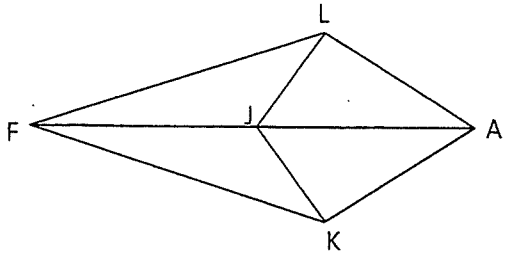
3. Given: $\overline{DB}$ bisects $\angle ADC$; $\angle 3 \cong \angle 4$

   Prove: $\angle 5 \cong \angle 6$



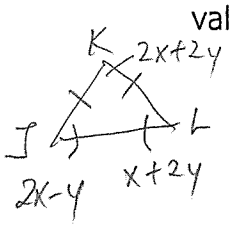
4. Given: $\overline{LF} \cong \overline{KF}$; $\overline{LA} \cong \overline{KA}$

   Prove: $\overline{LJ} \cong \overline{KJ}$



Mixed review of isosceles triangles.

1. In ΔJKL, $\overline{JK} \cong \overline{KL}$, m∠J = 2x − y, m∠K = 2x + 2y and m∠L = x + 2y. Find the value of each interior angles of the triangle.



$2x - y = x + 2y$

$(2x+2y)+(2x-y)+(x+2y)=180$

$x = 3y$

$5x + 3y = 180$

$5x + x = 180$

$6x = 180$

$x = 30$

$x = 3y$

$30 = 3y$

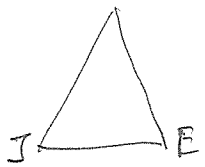
$10 = y$

$m\angle J = 50$

$m\angle K = 80$

$m\angle L = 50$

2. ΔJEN is isosceles with vertex ∠N. If J(2,5), E(-2,1) and N(4,y), find y.



$\overline{JN} \cong \overline{NE}$

$d_{JN} = d_{NE}$

$\sqrt{(2-4)^2+(5-y)^2} = \sqrt{(-2-4)^2+(1-y)^2}$

$4 + 25 - 10y + y^2 = 36 + 1 - 2y + y^2$

$29 - 37 = 8y$

$-1 = y$

CK

$\sqrt{4+(5--1)^2} = JN$

$\sqrt{4+36}$

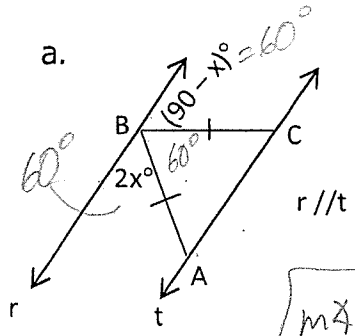
$\sqrt{40} = JN$

$\sqrt{36+(1+1)^2}$

$\sqrt{40} = NE$ ✓

3. Find the m∠ABC.

a.



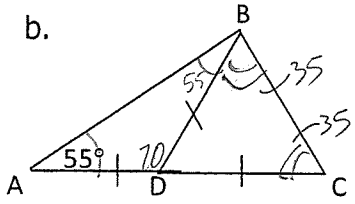
$2x = 90 - x$

$3x = 90$

$x = 30$

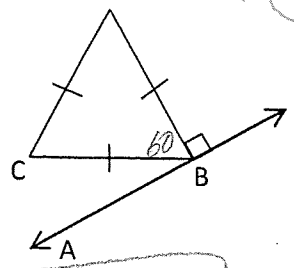
$m\angle ABC = 60°$

b.



$m\angle ABC = 90°$

c.



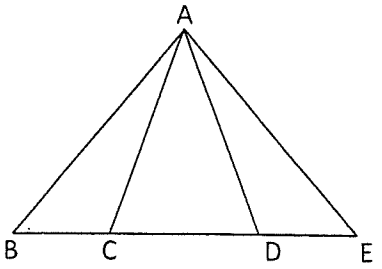
$m\angle ABC = 30°$

4. Write a flow proof

Given: ΔADC isosceles with vertex ∠A

$\overline{BC} \cong \overline{ED}$

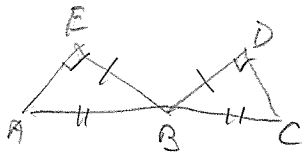
Prove: ΔABE isosceles



See last page

Homework Key for Using Hy-Leg Thm

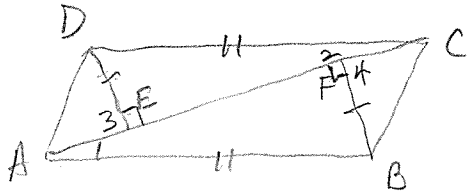
P ①



① $\overline{BE} \perp \overline{AE}$ → ② $\angle E$ is Rt. → ③ $\triangle AEB$ is Rt $\triangle$.
$\overline{BD} \perp \overline{DC}$ → $\angle D$ is Rt. → $\triangle CDB$ is Rt. $\triangle$.
④ B midpt $\overline{AC}$ → ⑤ $\overline{AB} \cong \overline{BC}$
⑥ $\overline{BE} \cong \overline{BD}$
} → ⑦ $\triangle AEB \cong \triangle CDB$ → ⑧ $\angle A \cong \angle C$

① Given
② $\perp$ lines form Rt $\angle$.
③ Rt $\triangle$ has Rt $\angle$.
④ Given
⑤ Midpt ÷ segmt into 2 $\cong$ seg.
⑥ Given
⑦ Hy Leg Thm
⑧ CPCTC

P ②



① $\overline{DE} \perp \overline{AC}$ → ② $\angle DEC$ is Rt. $\angle$ → ③ $\triangle DEC$ is Rt $\triangle$.
$\overline{BF} \perp \overline{AC}$ → $\angle AFB$ is Rt $\angle$ → $\triangle BFA$ is Rt $\triangle$.
④ $\overline{AB} \cong \overline{CD}$
$\overline{DE} \cong \overline{BF}$
} → ⑤ $\triangle DEC \cong \triangle BFA$

Part a done! ⑥ $\angle 1 \cong \angle 2$

⑦ $\angle 3$ & $\angle H$ Rt $\angle$s, → ⑧ $\angle 3 \cong \angle 4$
→ ⑨ $\overline{EC} \cong \overline{AF}$ → ⑩ $\overline{AE} \cong \overline{FC}$
⑪ $\overline{DE} \cong \overline{BF}$
} → ⑫ $\triangle ADE \cong \triangle CBF$

Part c done!

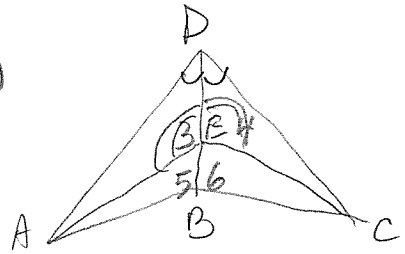
⑬ $\overline{AD} \cong \overline{CB}$

① Given
② $\perp$ lines form Rt $\angle$s
③ Rt $\triangle$ has rt. $\angle$.
④ Given
⑤ hyLeg $\cong$ hyLeg

⑥ CPCTC
⑦ $\perp$ lines form Rt $\angle$s.
⑧ All rt $\angle$s $\cong$.
⑨ CPCTC

⑩ Common Segmts Thm
⑪ Given
⑫ SAS Thm
⑬ CPCTC

(P3)



(1) $\overline{DB}$ bisects $\angle ADC$ → (2) $\angle ADB \cong \angle CDB$
(3) $\overline{DE} \cong \overline{DE}$
(4) $\angle 3 \cong \angle 4$
→ (5) $\triangle ADE \cong \triangle CDE$

(6) $\angle 3$ & $\angle AEB$ linear pr. → (7) $\angle 3$ supp $\angle AEB$
$\angle 4$ & $\angle CEB$ linear pr. → $\angle 4$ supp $\angle CEB$
→ (8) $\angle 3 \cong \angle 4$
→ (9) $\angle AEB \cong \angle CEB$

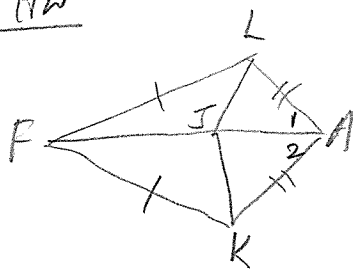
→ (10) $\overline{AE} \cong \overline{CE}$
(11) $\overline{EB} \cong \overline{EB}$

(12) $\triangle AEB \cong \triangle CEB$ → (13) $\angle 5 \cong \angle 6$

(1) Given
(2) $\angle$ bisector divides $\angle$ into 2 $\cong$ parts.
(3) Reflexive Property
(4) Given
(5) ASA thm
(6) linear pair def.
(7) linear pair post.
(8) CPCTC
(9) $\cong$ Symm. Thm
(10) CPCTC
(11) Reflexive Prop.
(12) ASA thm
(13) CPCTC

6-3 HW

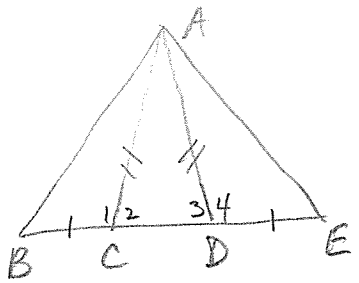
④



① $\overline{LF} \cong \overline{KF}$
$\overline{LA} \cong \overline{KA}$
② $\overline{AF} \cong \overline{AF}$
→ ③ $\triangle ALF \cong \triangle AKF$ → ④ $\angle 1 \cong \angle 2$
⑤ $\overline{LA} \cong \overline{KA}$
⑥ $\overline{JA} \cong \overline{JA}$
→ ⑦ $\triangle ALJ \cong \triangle AKJ$
→ ⑧ $\overline{LJ} \cong \overline{KJ}$

① Given
② Reflexive Prop
③ SSS Post.
④ CPCTC
⑤ Given
⑥ Reflexive Prop.
⑦ SAS thm
⑧ CPCTC

Proof #4 (back page)



① $\triangle ADC$ isos. → ② $\overline{AC} \cong \overline{AD}$ → ③ $\angle 2 \cong \angle 3$
④ $\angle 1$ & $\angle 2$ linear pair. → ⑤ $\angle 1$ supp $\angle 2$
$\angle 3$ & $\angle 4$ lin. pair. → $\angle 3$ supp $\angle 4$
→ ⑥ $\angle 1 \cong \angle 4$
⑦ $\overline{AC} \cong \overline{AD}$
⑧ $\overline{BC} \cong \overline{DE}$
→ ⑨ $\triangle ABC \cong \triangle AED$
→ ⑩ $\angle B \cong \angle E$ → ⑪ $\overline{AB} \cong \overline{AE}$ → ⑫ $\triangle ABE$ isosceles.

① Given
② Isos. $\triangle$ has 2 $\cong$ sides.
③ 2 sides of $\triangle \cong$ → $\angle$s opp $\cong$.
④ Linear pair are 2 adj. $\angle$s that form a straight line.
⑤ Linear pair are supp.
⑥ $\cong$ supp. thm
⑦ Isos. $\triangle$ has 2 $\cong$ sides.
⑧ Given
⑨ SAS thm
⑩ CPCTC
⑪ 2 $\angle$s of $\triangle \cong$ → sides opp $\cong$.
⑫ Isos. $\triangle$ has 2 $\cong$ sides.