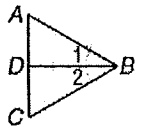
Acc Geometry
4.6 Isosceles & Equilateral Proof Practice

Name KEY
Date

Do pg. 258 #5-10, 16-27, 32, 35 (See bottom of page)

1.

Write a two-column proof.
Given: $\triangle ABC$ is equilateral; $\angle 1 \cong \angle 2$.
Prove: $\angle ADB \cong \angle CDB$



WTS $\triangle ADB \cong \triangle CDB$

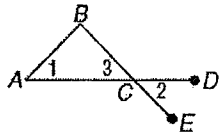
Proof:

Statements	Reasons
① $\triangle ABC$ is equilateral, $\angle 1 \cong \angle 2$	① given
② $\angle A \cong \angle C$	② An equilateral $\triangle$ is equiangular
③ $\overline{DB} \cong \overline{DB}$	③ Reflexive
④ $\triangle ADB \cong \triangle CBB$	④ AAS
⑤ $\angle ADB \cong \angle CDB$	⑤ CPCTC

2.

Write a two-column proof.
Given: $\angle 1 \cong \angle 2$
Prove: $\overline{AB} \cong \overline{CB}$

WTS $\angle 1 \cong \angle 3$



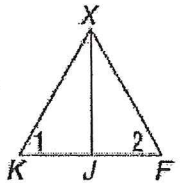
Statements	Reasons
① $\angle 1 \cong \angle 2$	① given
② $\angle 2 = \angle 3$	② Vertical $\angle$s are $\cong$
③ $\angle 1 = \angle 3$	③ Transitive
④ $\overline{AB} \cong \overline{CB}$	④ If base $\angle$s are $\cong$, then the legs are $\cong$

⑤. $\angle LTR \cong \angle LRT$
⑥. $\angle LXW \cong \angle LWX$
⑦. $\angle LSQ \cong \angle LQS$
⑧ $\overline{LX} \cong \overline{LY}$
⑨. $\overline{LS} \cong \overline{LR}$
⑩. $\overline{LY} \cong \overline{LW}$

⑯. 20
⑰. 140
⑱. 81
⑲. 106
⑳. 365
㉑. 305
㉒. 28
㉓. 124
㉔. 56
㉕. 68
㉖. 38
㉗ 111
㉜ 18
㉟ $m\angle 1 = 18$ $m\angle 4 = 19$
$m\angle 2 = 17$ $m\angle 5 = 18$
$m\angle 3 = 26$

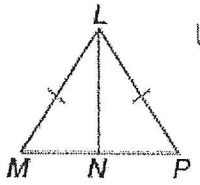
3. **Given:** $\triangle XKF$ is equilateral.
$\overline{XJ}$ bisects $\angle X$.
Prove: J is the midpoint of $\overline{KF}$.

WTS $KJ \cong FJ$



Statement	Justification
① $\triangle XKF$ is equilateral $\overline{XJ}$ bisects $\angle X$	① given
② $\angle 1 \cong \angle 2$	② An equilateral $\triangle$ is equiangular
③ $\angle KXJ \cong \angle FXJ$	③ Def of $\angle$ bisector
④ $\overline{XJ} \cong \overline{XJ}$	④ Reflexive
⑤ $\triangle KXJ \cong \triangle FXJ$	⑤ AAS
⑥ $\overline{KJ} \cong \overline{FJ}$	⑥ CPCTC
⑦ J is the midpoint of $\overline{KF}$	⑦ Def of midpoint

4. **Given:** $\triangle MLP$ is isosceles.
N is the midpoint of $\overline{MP}$.
Prove: $\overline{LN} \perp \overline{MP}$

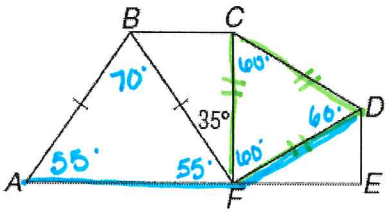


WTS $\angle LNP = 90$ or $\angle LNM = 90$

Statements	Justifications
① $\triangle MLP$ is isosceles N is midpoint of $\overline{MP}$	① given
② $\overline{LM} \cong \overline{LP}$	② Def of isosceles $\triangle$
③ $\overline{MN} \cong \overline{PN}$	③ Def of midpoint
④ $\angle M \cong \angle P$	④ Base $\angle$s of an isosceles $\triangle$ are $\cong$
⑤ $\triangle LMN \cong \triangle LPN$	⑤ SAS
⑥ $\angle LNM + \angle LNP = 180$	⑥ Linear pairs are suppl.
⑦ $\angle LNM \cong \angle LNP$	⑦ CPCTC
⑧ $\angle LNM + \angle LNM = 180$	⑧ Substitution
⑨ $2\angle LNM = 180$	⑨ Substitution (CLT)
⑩ $\angle LNM = 90$	⑩ Division
⑪ $\overline{LN} \perp \overline{MP}$	⑪ Def of $\perp$

4.6 Examples

$\triangle ABF$ is isosceles, $\triangle CDF$ is equilateral, and $m\angle AFD = 150$. Find each measure.



1. m<CFD

$= 60°$

equilateral is equiangular

2. m<AFB $= 55°$

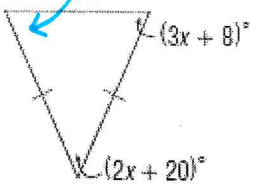
3. m<ABF $= 70°$

4. m<A

$55°$

5. Find x.

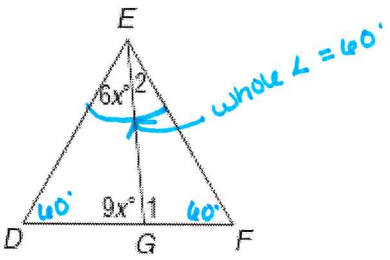
3x + 8 shows in picture base $\angle$s of isos $\triangle$ are $\cong$



$3x+8+3x+8+2x+20=180$ $\triangle$ sum

$x = 18$

6. $\triangle DEF$ is equilateral.



$\angle D + \angle DEG + \angle EGD = 180°$ $\triangle$ sum

$60 + 6x + 9x = 180$

$x = 8$

$\angle 2 + 6x = 60$

$\angle 2 + 6 \cdot 8 = 60$

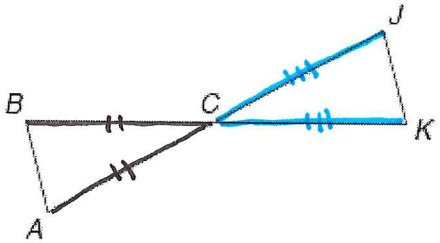
$\angle 2 + 48 = 60$

$\angle 2 = 12°$ $\angle 1 = 108°$

7. **Given:** $\overline{CA} \cong \overline{BC}$; $\overline{KC} \cong \overline{CJ}$

C is the midpoint of $\overline{BK}$.

Prove: $\triangle ABC \cong \triangle JKC$



1. $CA \cong BC$, $KC \cong CJ$, C is midpt of BK	1. given
2. $BC \cong KC$	2. def of midpt
3. $CA \cong CJ$	3. Substitution
4. $\angle BCA \cong \angle KCJ$	4. vertical $\angle$s are $\cong$
5. $\triangle ABC \cong \triangle JKC$	5. SAS