

Name: Kelly

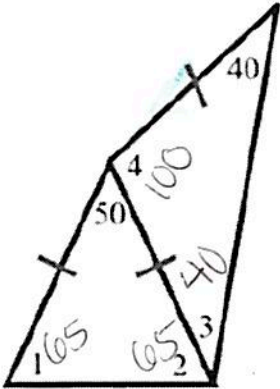
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UNIT 3

LESSON 10

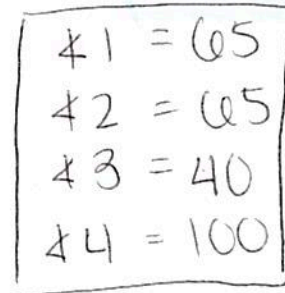
AIM: HOW DO WE WRITE PROOFS INVOLVING ISOSCELES TRIANGLES?

Do Now: Find all missing angles in the diagram below.

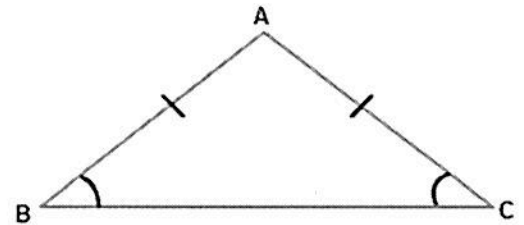


$$180 - 50 = 130$$

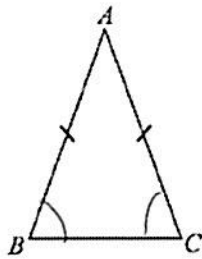
$$130 \div 2 = 65$$



RECALL: Isosceles triangles have two congruent sides and two congruent base angles.

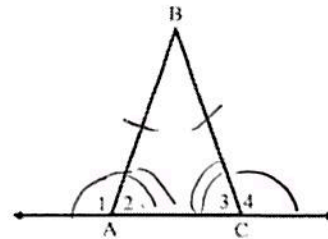


If $\overline{AB} \cong \overline{AC}$, what can you conclude?



statement	Reason
① $\overline{AB} \cong \overline{AC}$	① Given
② $\triangle ABC$ is isosceles	② isosceles \triangle 's have 2 \cong sides
③ $\angle B \cong \angle C$	③ isosceles \triangle 's have 2 \cong base angles

If $m\angle 1 \cong m\angle 4$, what can you conclude?



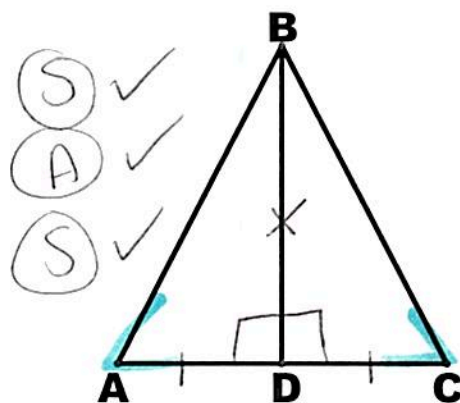
statement	Reason
① $\angle 1 \cong \angle 4$	① given
② $\angle 1 + \angle 2 = 180$ $\angle 3 + \angle 4 = 180$	② linear pairs are supplementary
③ $\angle 2 \cong \angle 3$	③ supplements of $\cong \angle$'s are \cong
④ $\triangle ABC$ is isosceles	④ isosceles \triangle 's have 2 \cong base \angle 's
⑤ $\overline{AB} \cong \overline{BC}$	⑤ isosceles \triangle 's have 2 \cong sides

EXAMPLE #1:

Given: \overline{BD} is the perpendicular bisector of \overline{AC} .

Prove: $\triangle ABC$ is isosceles

③
 ② $\angle A \cong \angle C$
 OR
 $\overline{AB} \cong \overline{BC}$ } CPCTC
 ① $\triangle BAD \cong \triangle BCD$



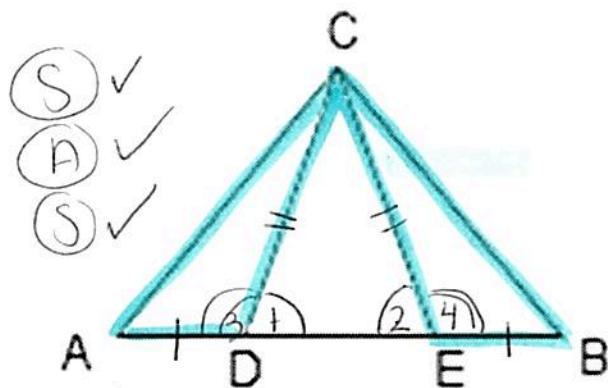
STATEMENT	REASON
① \overline{BD} is the \perp bisector of \overline{AC}	① Given
② $\overline{AD} \cong \overline{DC}$ ✓ (S)	② A bisector creates 2 \cong segments
③ $\angle ADB \cong \angle CDB$ ✓ (A)	③ \perp lines form \cong right angles
④ $\overline{BD} \cong \overline{BD}$ ✓ (S)	④ Reflexive property
⑤ $\triangle BAD \cong \triangle BCD$	⑤ SAS \cong SAS
⑥ $\angle A \cong \angle C$	⑥ CPCTC
⑦ $\triangle ABC$ is isosceles	⑦ isosceles \triangle 's have 2 \cong base \angle 's

EXAMPLE #2:

Given: $\overline{AD} \cong \overline{BE}$
 $\overline{CD} \cong \overline{CE}$

Prove: $\overline{CA} \cong \overline{CB}$

① $\Delta CAD \cong \Delta CBE$



STATEMENT	REASON
① $\overline{AD} \cong \overline{BE}$ and $\overline{CD} \cong \overline{CE}$	① Given
② ΔDCE IS ISOSCELES	② ISOSCELES Δ 'S HAVE 2 \cong SIDES
③ $\angle 1 \cong \angle 2$	③ ISOSCELES Δ 'S HAVE 2 \cong BASE \angle 'S
④ $\angle 1 + \angle 3 = 180$ $\angle 2 + \angle 4 = 180$	④ Linear pairs are supp.
⑤ $\angle 3 \cong \angle 4$	⑤ SUPPLEMENTS OF \cong \angle 'S ARE \cong
⑥ $\Delta CAD \cong \Delta CBE$	⑥ SAS \cong SAS
⑦ $\overline{CA} \cong \overline{CB}$	⑦ CPCTC

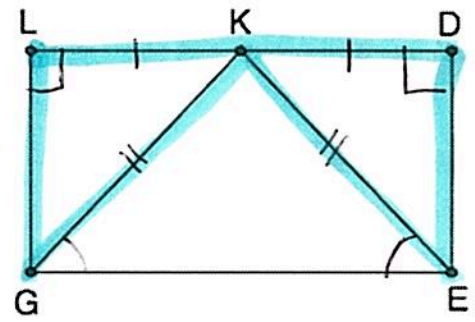
EXAMPLE #3:

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: $\overline{LG} \cong \overline{DE}$

$\hookrightarrow \triangle GLK \cong \triangle EDK$

✓ Right \triangle
 (H) ✓
 (L) ✓



STATEMENT	REASON
① $\angle KGE \cong \angle KEG$, $\overline{GL} \perp \overline{LD}$, $\overline{ED} \perp \overline{DL}$ and K is the midpoint of \overline{LD}	① Given
② $\angle L$ and $\angle D$ are right \angle 's	② \perp lines form right \angle 's
③ $\triangle GLK$ and $\triangle EDK$ are right \triangle 's ✓	③ Right \triangle 's have 1 right \angle
④ $\triangle KGE$ is isosceles	④ Isosceles \triangle 's have 2 \cong base \angle 's
⑤ $\overline{KG} \cong \overline{KE}$ (H) ✓	⑤ Isosceles \triangle 's have 2 \cong sides
⑥ $\overline{LK} \cong \overline{KD}$ ✓	⑥ A midpoint creates 2 \cong segments
⑦ $\triangle GLK \cong \triangle EDK$	⑦ HL \cong HL
⑧ $\overline{LG} \cong \overline{DE}$	⑧ CPCTC

Name: Kelly

HW policy for next yr

Date: _____

UNIT 3

LESSON 10 HOMEWORK

1. If a triangle is equilateral, then it is isosceles. TRUE or FALSE?

If all 3 sides are \cong , then it also has the properties of an isosceles Δ .

- to be completed & checked in diff. color by next class
- not checked daily
- collected 1x/week
- problems on tests

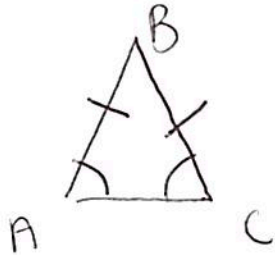


isosceles Δ !

$$\begin{array}{r} 52 \\ -32 \\ \hline 20 \end{array}$$

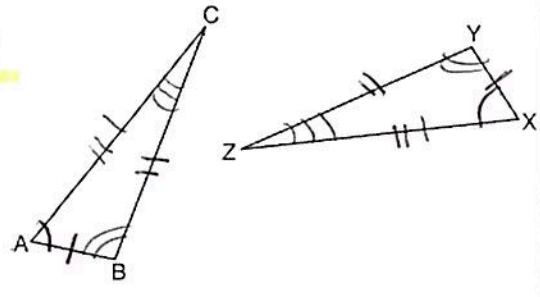
3. In isosceles triangle ABC, $AB = BC$. Which statement will always be true?

- 1) $m\angle B = m\angle A$
- 2) $m\angle A > m\angle B$
- 3) $m\angle A = m\angle C$
- 4) $m\angle C < m\angle B$

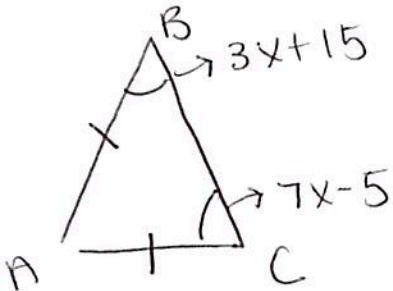


4. In the diagram below, $\triangle ABC \cong \triangle XYZ$. Which statement must be true?

- 1) $\angle C \cong \angle Y$
- 2) $\angle A \cong \angle X$
- 3) $\overline{AC} \cong \overline{YZ}$
- 4) $\overline{CB} \cong \overline{XZ}$



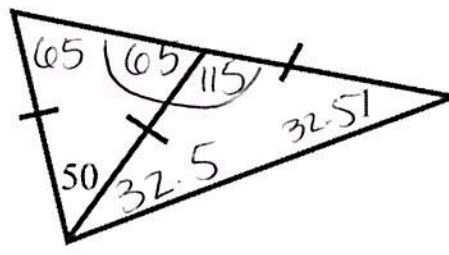
5. In $\triangle ABC$, if $\overline{AB} \cong \overline{AC}$, $m\angle B = 3x + 15$ and $m\angle C = 7x - 5$, find the $m\angle B$ and $m\angle C$.



$$\begin{array}{r} 3x + 15 = 7x - 5 \\ -3x + 5 \quad -3x + 5 \\ \hline 20 = 4x \end{array}$$

$$\begin{aligned} x &= 5 \\ \angle B &= 3(5) + 15 = 30 \\ \angle C &= 7(5) - 5 = 30 \end{aligned}$$

6. Find the $m\angle 1$



$$\begin{aligned} 180 - 50 &= 130 \\ 130 \div 2 &= 65 \\ 180 - 65 &= 115 \\ 180 - 115 &= 65 \\ 65 \div 2 &= 32.5 = \angle 1 \end{aligned}$$

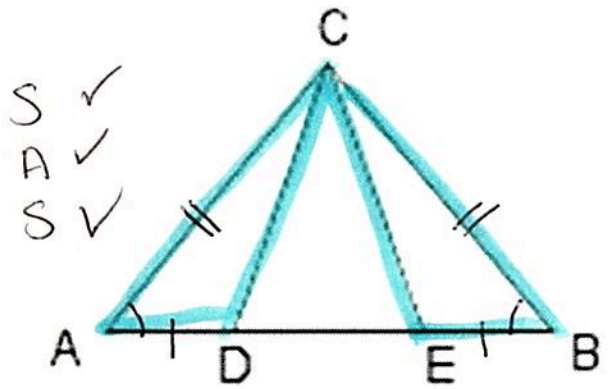


Given: $\overline{AD} \cong \overline{BE}$

$\overline{CA} \cong \overline{CB}$

Prove: $\overline{CD} \cong \overline{CE} \rightarrow$ CPCTC!

$\hookrightarrow \triangle ACD \cong \triangle BCE$



STATEMENT	REASON
① $\overline{AD} \cong \overline{BE} \checkmark$ (S) $\overline{CA} \cong \overline{CB} \checkmark$ (S)	① Given
② $\triangle ABC$ is isosceles	② Isosceles \triangle 's have 2 \cong sides
③ $\angle A \cong \angle B \checkmark$ (A)	③ Isosceles \triangle 's have 2 \cong base \angle 's
④ $\triangle ACD \cong \triangle BCE$	④ SAS \cong SAS
⑤ $\triangle CAD \cong \triangle CBE$	⑤ CPCTC