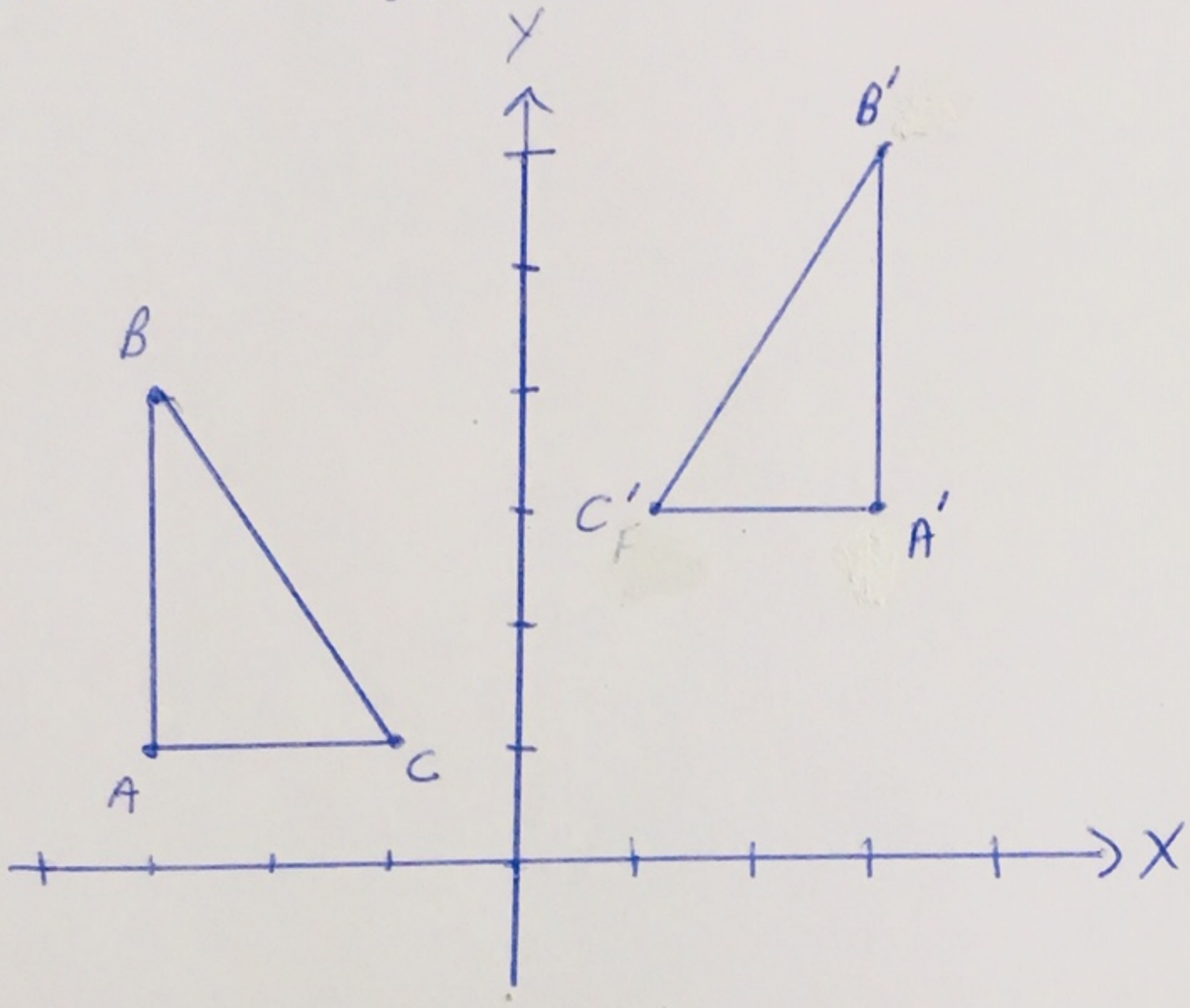
R 3.1

Use coordinate notation to show the transformations.



$(x,y) \rightarrow (-x,y)$ (reflection over the y-axis)

$(x,y) \rightarrow (x,y+2)$ (translation)

Are the triangles congruent? Use SSS to find the distances of all sides.

$AC \cong A'C'$ (2 units)

$AB \cong A'B'$ (3 units)

$BC: 2^2+3^2=BC^2$

$4+9=BC^2$

$13=BC^2$

$\sqrt{13}=BC$

$B'C': 2^2+3^2=(B'C')^2$

$4+9=(B'C')^2$

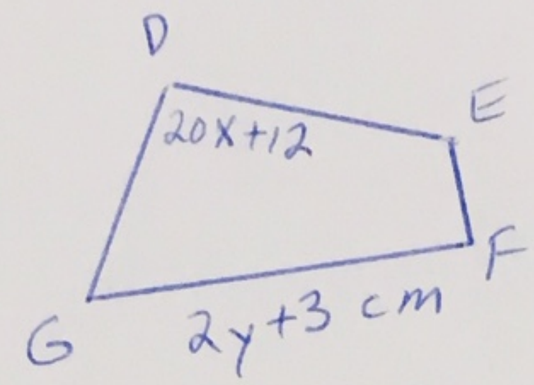
$13=(B'C')^2$

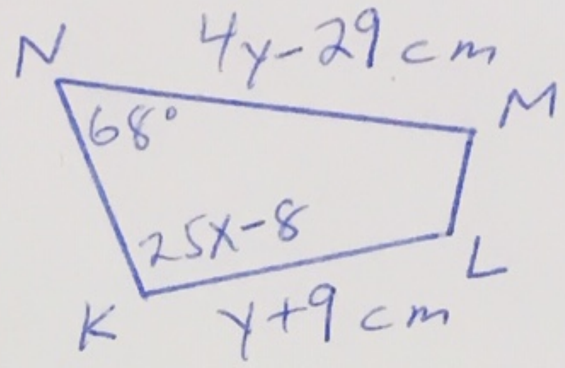
$\sqrt{13}=B'C'$

So yes, the triangles are congruent.

R 3.3

$DEFG \cong KLMN$ Find the side length FG.





First figure out which segment in the right figure corresponds to FG. FG is the 3rd and 4th letter, which is also true for M and N.

We can also see that FG is the longest side, just like MN.

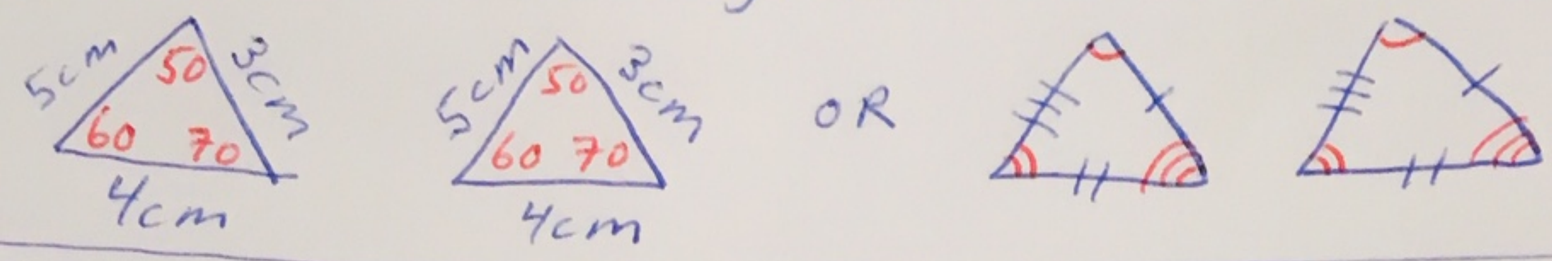
$$2y+3 = 4y-29$$
$$-2y \qquad -2y$$
$$3 = 2y - 29$$
$$+29 \qquad +29$$
$$32 = 2y$$
$$16 = y$$

So $FG = 2y+3 = 2 \cdot 16 + 3 = 35$ cm

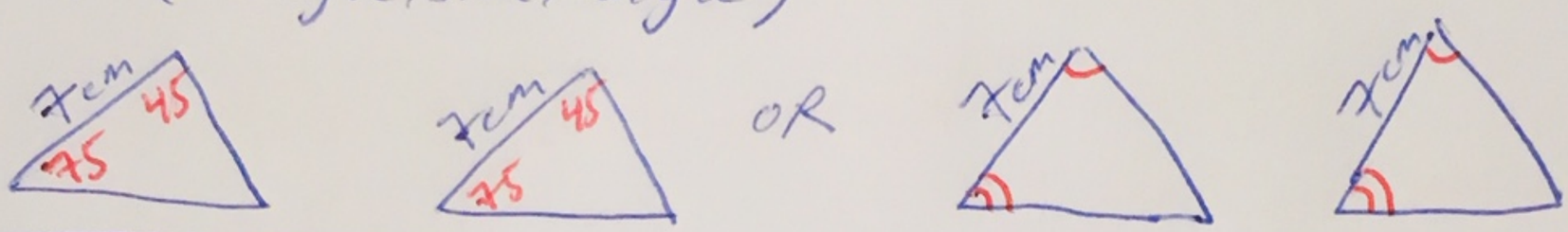
NOTES

What makes triangles congruent? (5.1-5.4, 6.2, 6.3)

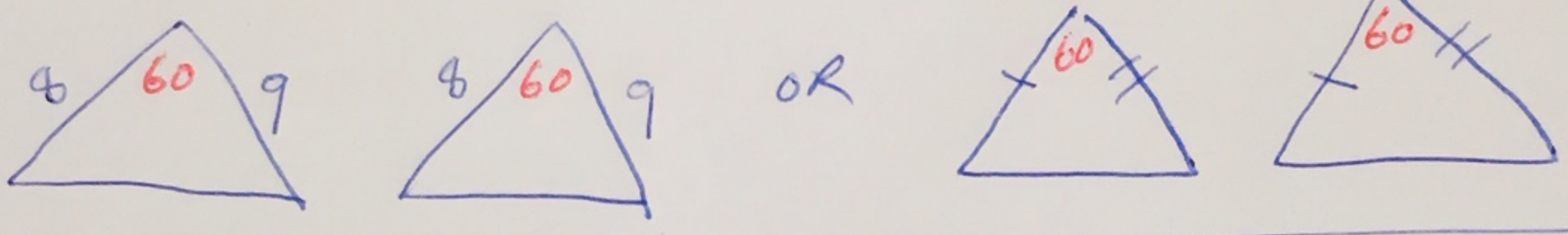
1.) 3 pairs of congruent angles
plus 3 pairs of congruent sides.



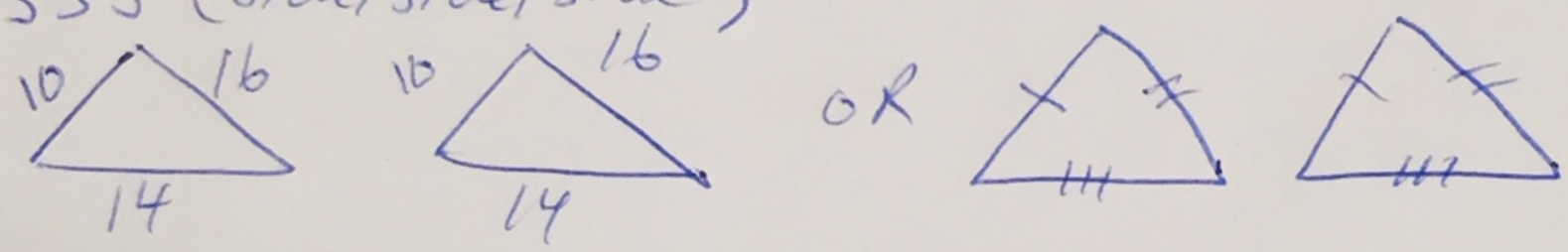
2.) ASA (=angle, side, angle)



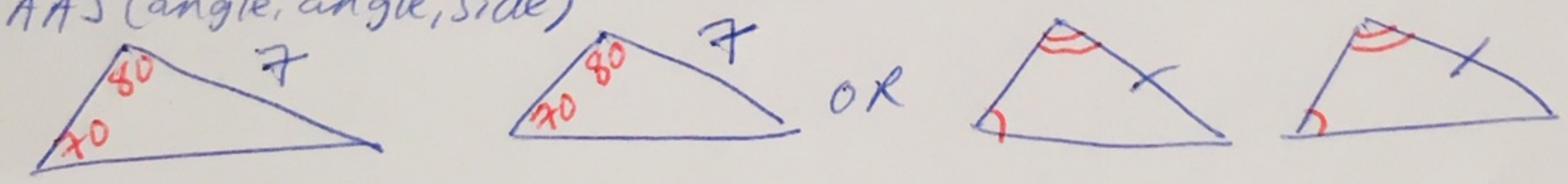
3.) SAS (side, angle, side)



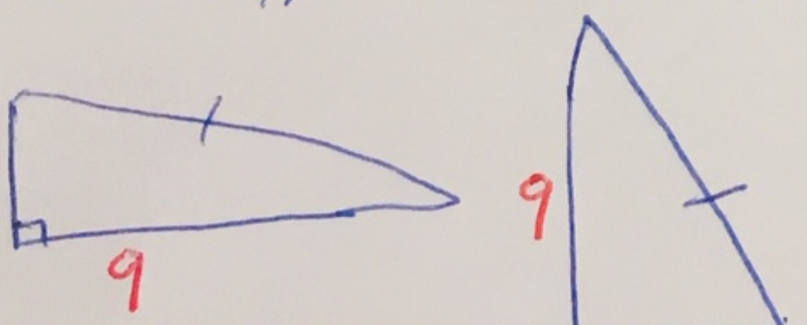
4.) SSS (side, side, side)



5.) AAS (angle, angle, side)

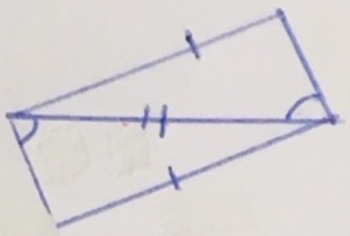


6.) HL (hypotenuse, leg)

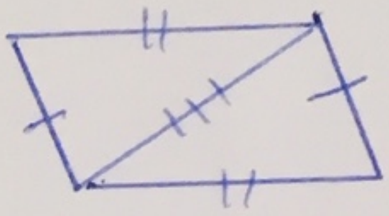


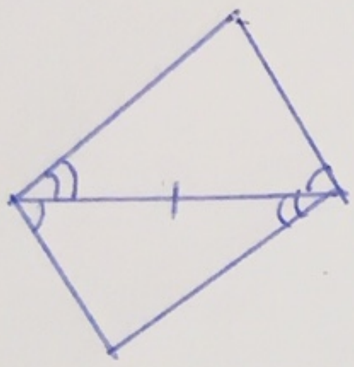
Notes / Warm-up

Are the △s congruent?



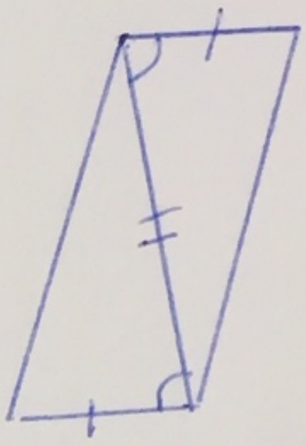
Yes,
SSS

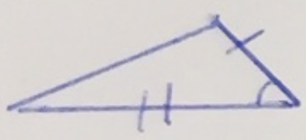


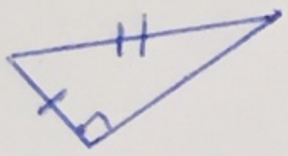


Yes,
ASA

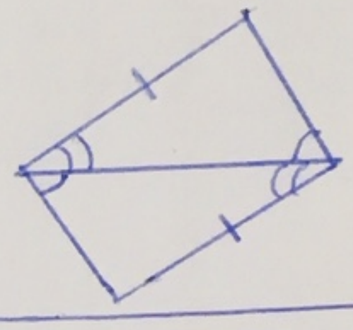
Yes,
SAS





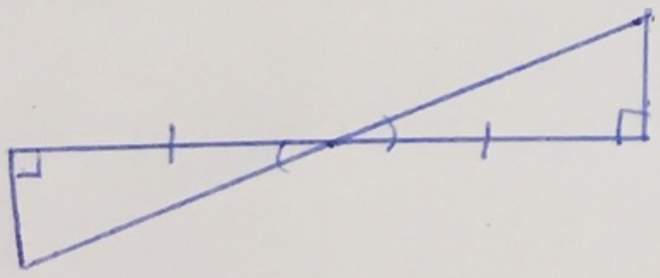


← No, can't skip a side. The right △ is SSA. The left △ is SAS.



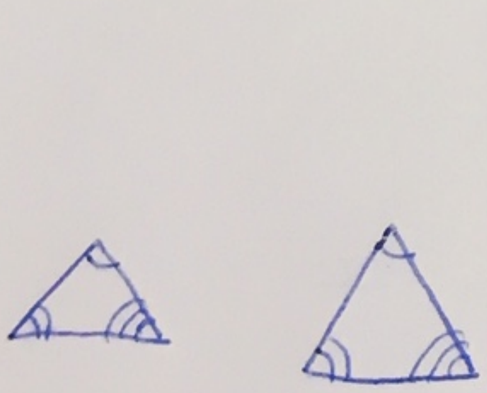
Yes,
AAS

Can we use SSA to tell if △s are congruent?

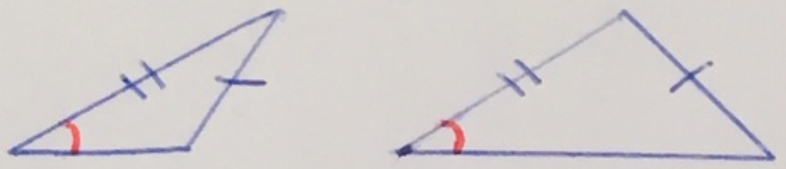


Yes,
ASA

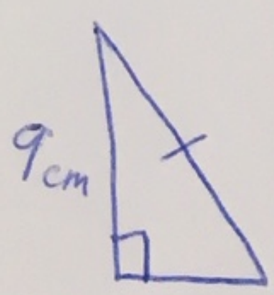
No, because:

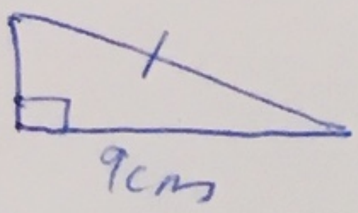


AAA:
No, not necessarily. Sides can be different even if angles are congruent.

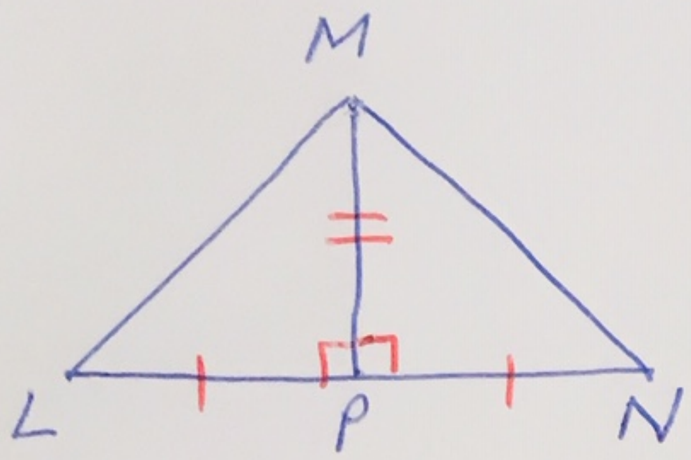


Yes,
HL





Prof. Burger's Example 5.3, video #4



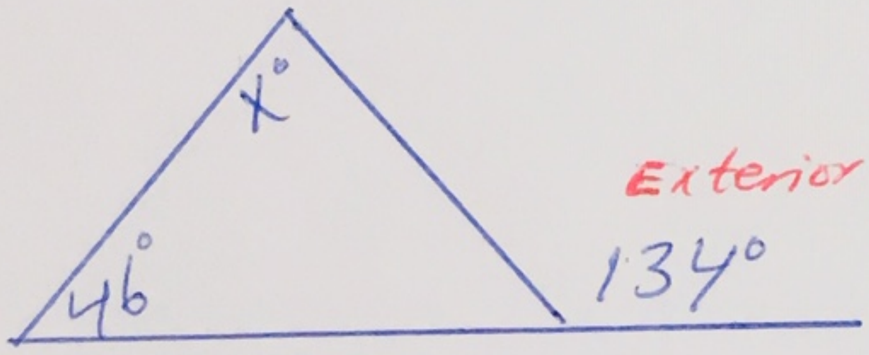
Given: $\overline{MP}$ is the perpendicular bisector of $\overline{LN}$.

Prove: $\triangle MLP \cong \triangle MNP$

Statements	Reasons
1. $\overline{MP}$ is perpendicular to $\overline{LN}$	1. Given
2. $LP = NP$	2. Def. of perpendicular bisector
3. $\overline{LP} \cong \overline{NP}$	3. Def. of congruent segments
4. $\overline{MP} \perp \overline{LN}$	4. Def. of perpendicular bisector.
5. $\angle MPL \cong \angle MPN$	5. Right angles are congruent to each other.
6. $\overline{MP} \cong \overline{MP}$	6. Reflexive Property
7. $\triangle MLP \cong \triangle MNP$	7. SAS

R 7.1

The two remote interior angles = The exterior angle.

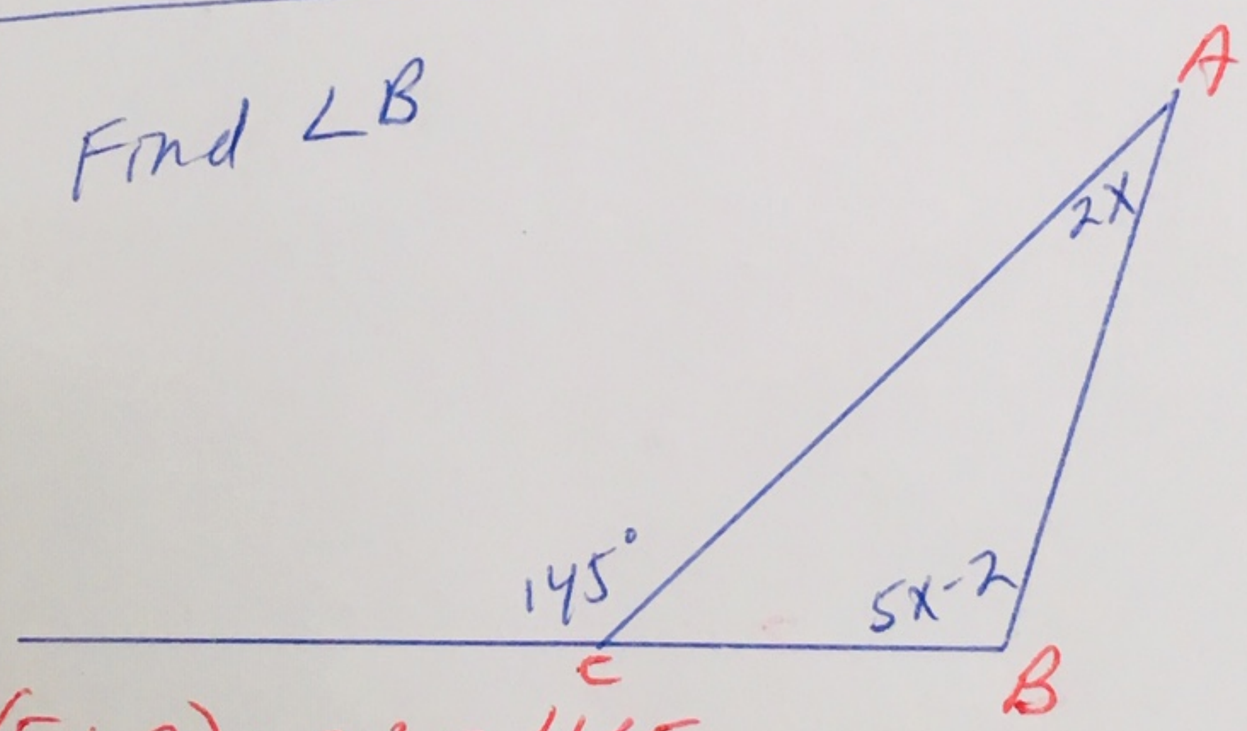


$x + 46^\circ = 134^\circ$

$-46^\circ \quad -46^\circ$

$x = 88^\circ$

Find $\angle B$



$(5x-2) + 2x = 145$

$7x - 2 = 145$

$+2 \quad +2$

$7x = 147$

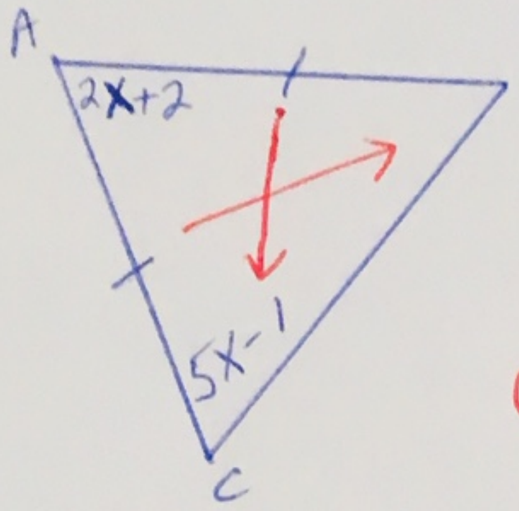
$\overline{7} \quad \overline{7}$

$x = 21$

$\angle B = 5x - 2 = 5 \cdot 21 - 2 = 103^\circ$

R 7.2

What is the measure of $\angle B$?



$\angle B$ and $\angle C$ are base angles so $\angle B$ is also $5X-1$.

$(5x-1)+(5x-1)+(2x+2)=180$

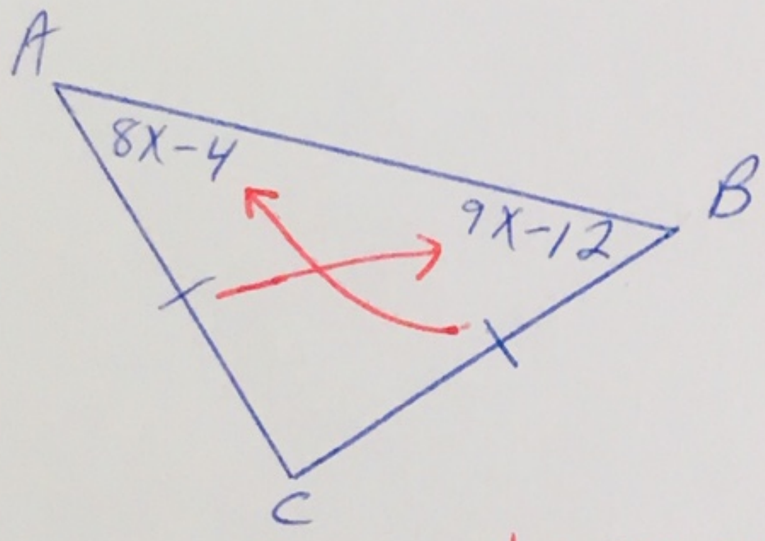
$12x = 180$

T2 T2

$x = 15$

So $\angle B = 5X-1 = 5(15)-1 = 74°$

What is $\angle A$ and $\angle C$?



$\angle A$ and $\angle B$ are base angles so they are congruent:

$8X-4=9X-12$

$-8X \quad -8X$

$-4 = X-12$

$+12 \quad +12$

$8 = X$

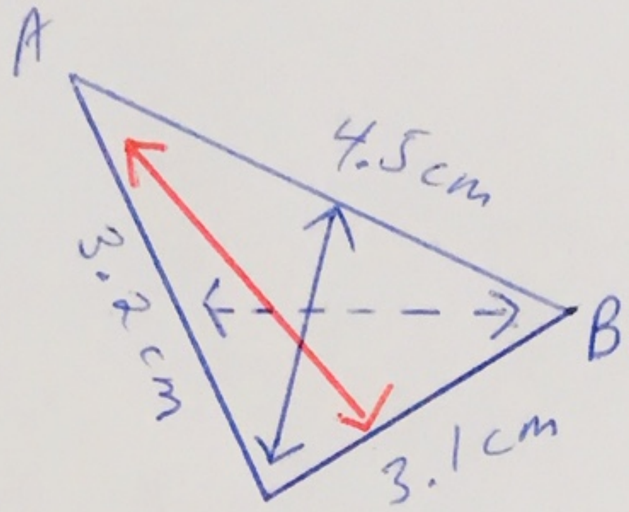
So $\underline{\angle A} = 8X-4 = 8\cdot(8)-4 = \underline{60°}$

$\angle B$ is also $60°$ (since $\angle A$ and $\angle B$ are base angles)

$\underline{\angle C} = 180-60-60 = \underline{60°}$

R 7.3

Show the angle measures from the smallest to the largest.

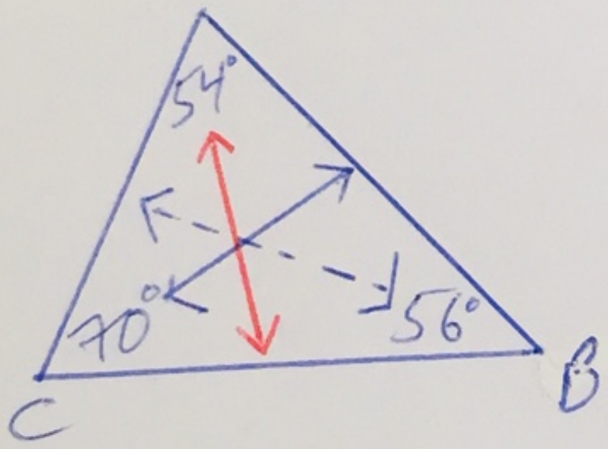


Smallest angle = opposite shortest side so ∠A

Middle angle = opposite middle side so ∠B

Largest angle = opposite longest side so ∠C

Which side is the longest?



shortest side = opposite smallest angle so $\overline{BC}$

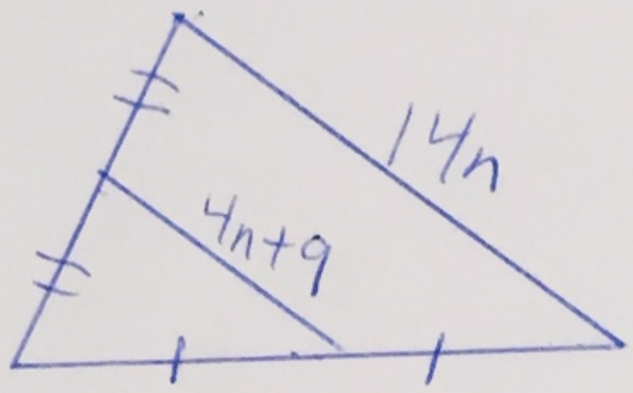
middle side = opposite middle angle so $\overline{AC}$

longest side = opposite Largest angle so $\overline{AB}$

Midsegments of triangles

R 8.4

Find n.



$2(4n+9) = 14n$

$8n + 18 = 14n$

$-8n \qquad -8n$

$18 = 6n$

$\frac{18}{6} = \frac{6n}{6}$

$3 = n$

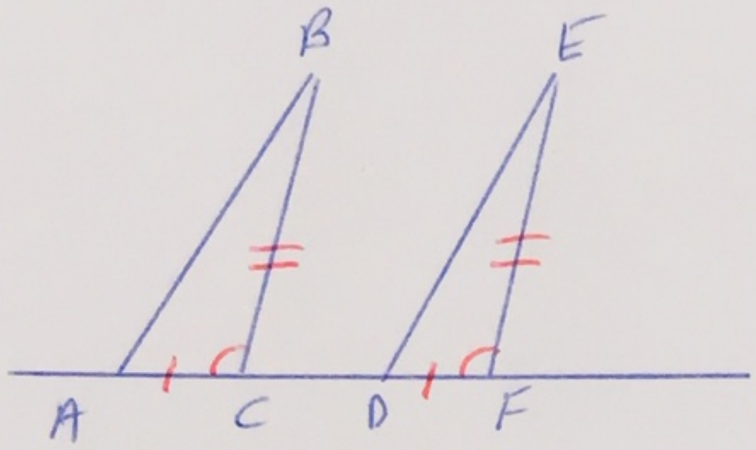
R
BIG IDEAS

How can you prove that two triangles are congruent?

1. Sequence of rigid transformations
2. All corresponding angles and sides of both triangles are congruent.
3. Triangle congruence by SSS, SAS, ASA, AAS, HL

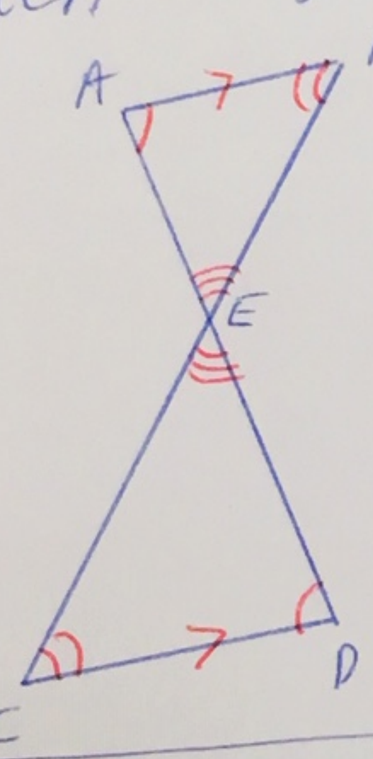
R
Proofs

What congruencies do you need to make the triangles congruent by SAS? Mark the triangles and write the congruencies.



$\overline{AC} \cong \overline{DF}$
$\angle C \cong \angle F$
$\overline{BC} \cong \overline{EF}$

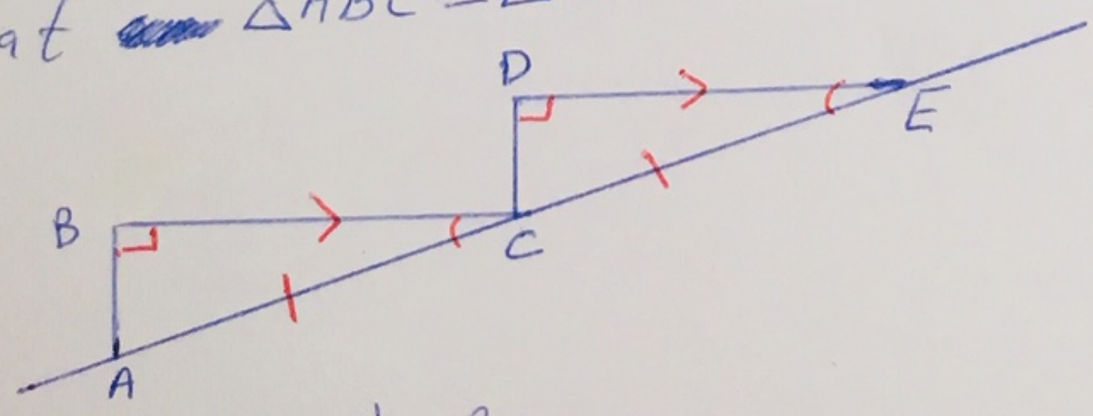
Mark and name both pairs of alternate interior angles and the vertical angles.



Alt. int. angles
$\angle A \cong \angle D$
$\angle B \cong \angle C$

Vertical angles
$\angle AEB \cong \angle CED$

Prove that $\triangle ABC \cong \triangle DEF$



Statement	Reason
$AC = CE$	Def. of midpoint
$\overline{AC} \cong \overline{CE}$	Def. of segment congruence
$\angle BCA \cong \angle DEC$	Corresponding Angles Theorem
$\angle B \cong \angle D$	Right Angle Congruency Theorem
$\triangle ABC \cong \triangle CDE$	AAS