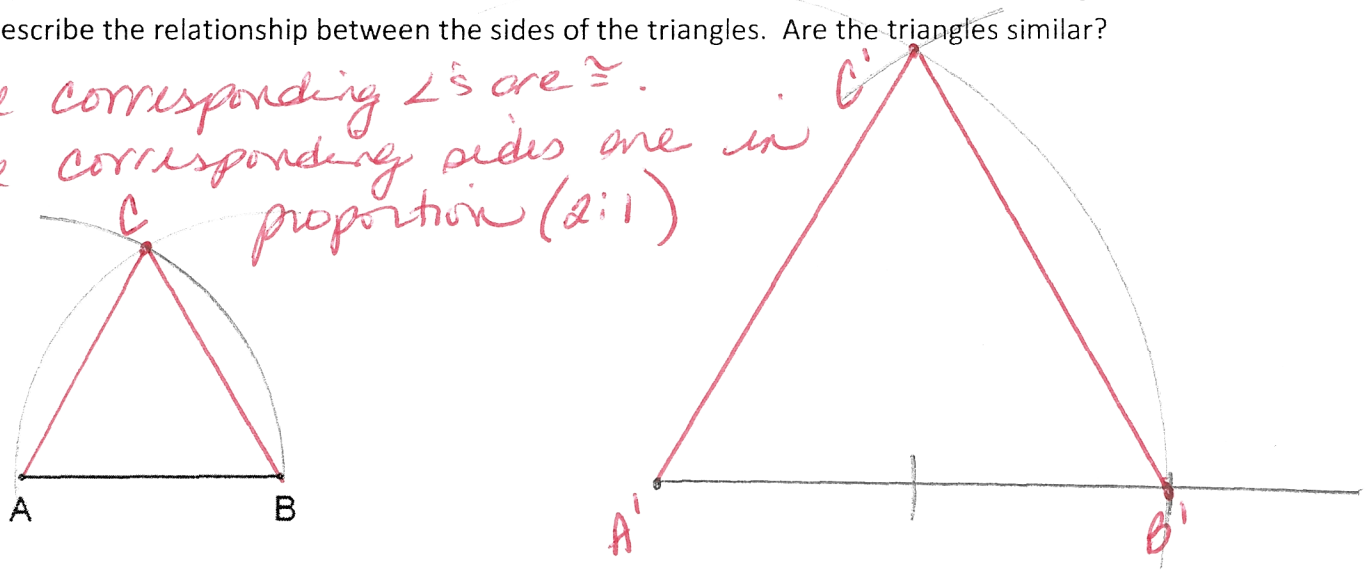
Name: Key _____ Date: _____

Applying Similarity of Triangles – AA~, SAS~, SSS~ Geo CC (Mod2 – L3a)

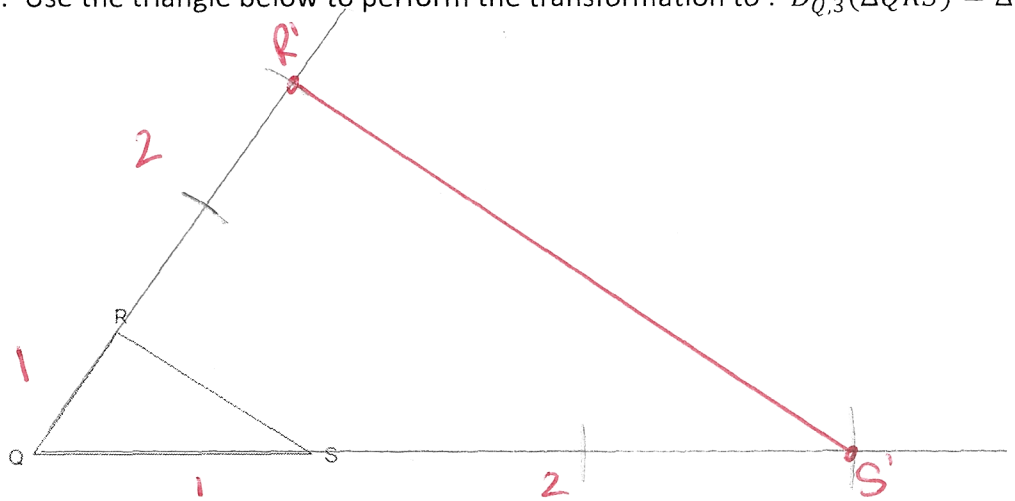
OPENING EXERCISES:

1. In the space provided below, construct an equilateral triangle using AB as one side. Then, construct another equilateral triangle that is twice the size. Describe the relationship between the angles of the triangles. Also, describe the relationship between the sides of the triangles. Are the triangles similar?

The corresponding ∠s are ≅.
The corresponding sides are in proportion (2:1)



2. Use the triangle below to perform the transformation to : $D_{Q,3}(\Delta QRS) = \Delta QR'S'$



Find the value of each ratio:

QS':QS? 3:1

R'S':RS? 3:1

R'R:QR? 2:1

$m\angle QRS : m\angle QR'S'$? 1:1

Besides the ratio, what is another relationship between RS and R'S'? Explain.

RS ∥ R'S'
a dilation maps lines to ∥ lines.

Corresponding angles are congruent and corresponding sides are in proportion. Therefore, ΔQRS and $\Delta QR'S'$ are similar(~)

3. Solve for x.

a) $\frac{4}{6}=\frac{x}{42}$

$6x=168$

$x=28$

b) $\frac{5}{15}=\frac{x}{x+8}$

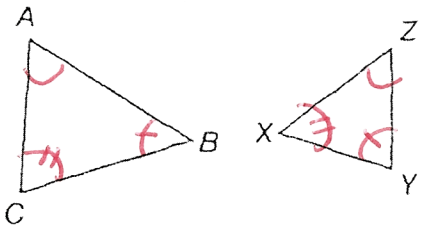
$15x=5x+40$

$10x=40$

$x=8$

Example 1: List all pairs of congruent angles, and write a proportion that relates the corresponding sides for each pair of similar polygons.

$\Delta ABC \sim \Delta ZYX$



$\angle A \cong \angle Z$

$\angle B \cong \angle Y$

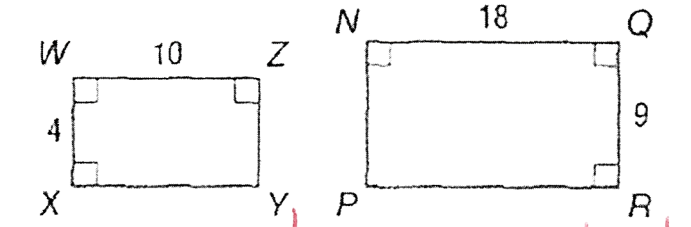
$\angle C \cong \angle X$

$\frac{AB}{ZY}=\frac{BC}{YX}=\frac{AC}{ZX}$

Are they similar?

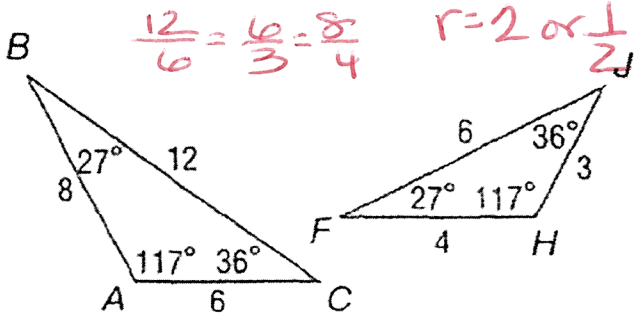
Example 2: Determine whether each pair of figures is similar. If so, write the similarity statement and scale factor. If not, explain your reasoning.

a



$\frac{18}{10}=\frac{9}{4}$ no! cross products are not = so sides $90 \neq 72$ are not in proportion

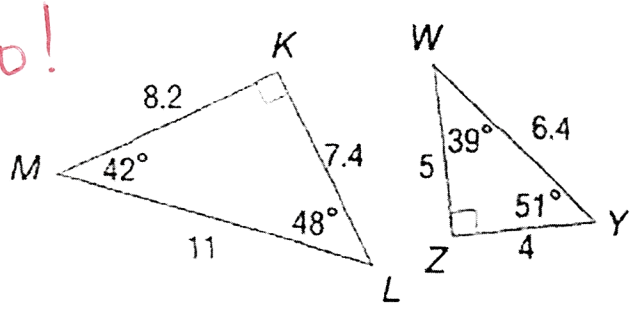
b



$\frac{12}{6}=\frac{6}{3}=\frac{8}{4}$ $r=2$ or $\frac{1}{2}$ yes.

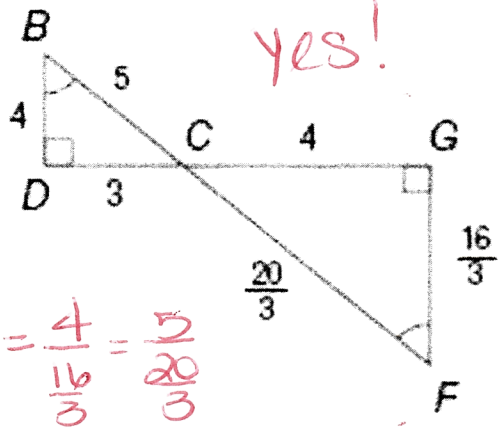
c

no!



d

yes!



$\frac{3}{4}=\frac{4}{\frac{16}{3}}=\frac{5}{\frac{20}{3}}$

Is it necessary to know the measures of all three angles of the triangles to prove that they are similar?

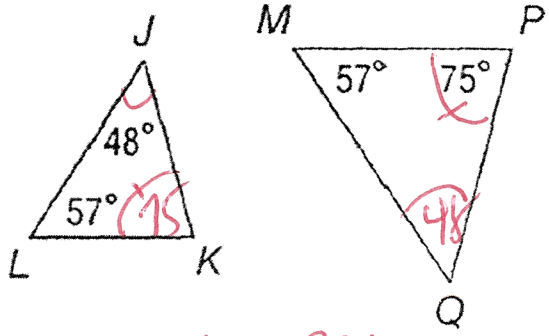
No! As long as 2 ∠'s are =, the 3rd will be as well.

Triangle Similarity Criteria	Describe
AA~	Two triangles are similar if 2 angles of one triangle are congruent to two corresponding angles of the other triangle.

Example 3:

Determine whether the triangles are similar. If so, write a similarity statement. Justify your reasoning.

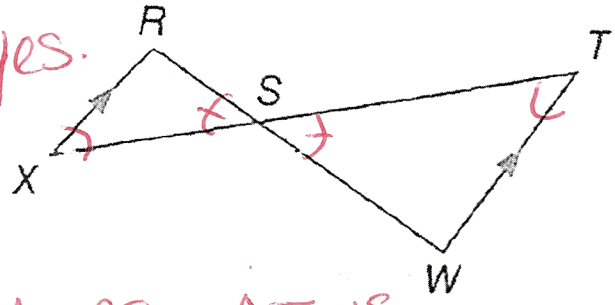
a.



yes

△JKL ~ △QPM by AA~

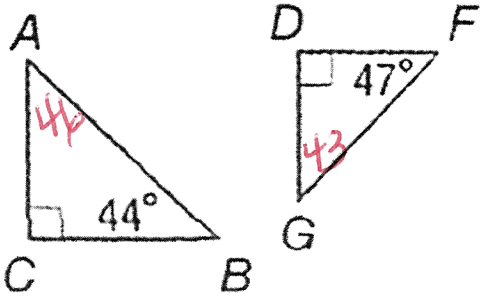
b.



yes.

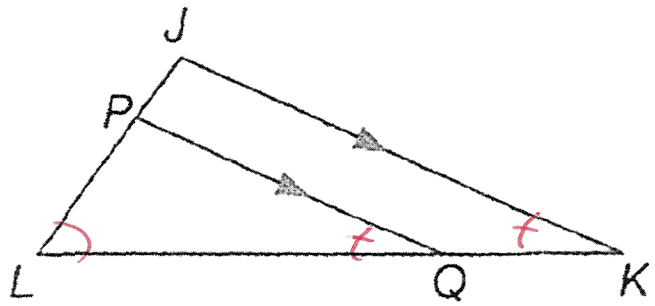
△XRS ~ △TWS by AA~

c.



no.

d.



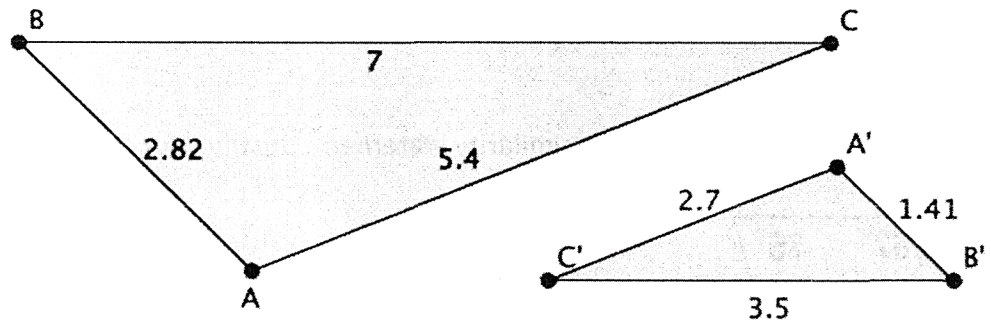
yes.

△PLQ ~ △JLK by AA~

Triangle Similarity Criteria	Describe
SSS~	Two triangles are similar if all 3 sides of one triangle are in proportion to all three corresponding sides of the other triangle.

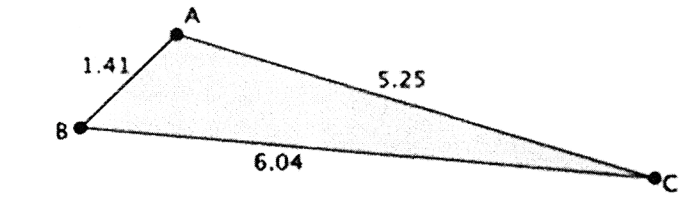
Determine if the triangles are similar and explain your reasoning. If they are similar, find the scale factor.

a

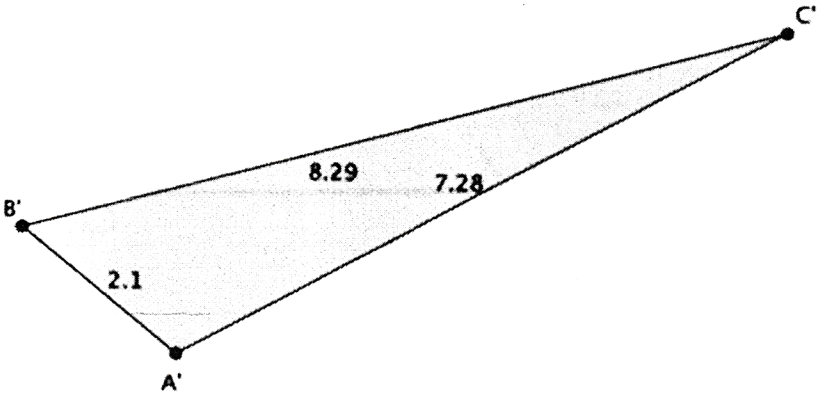


$\frac{1.41}{2.82} = \frac{3.5}{7} = \frac{2.7}{5.4}$ yes by SSS~ scale $= \frac{1}{2}$

b



$\frac{2.1}{1.41} \neq \frac{8.29}{6.04} \neq \frac{7.28}{5.25}$

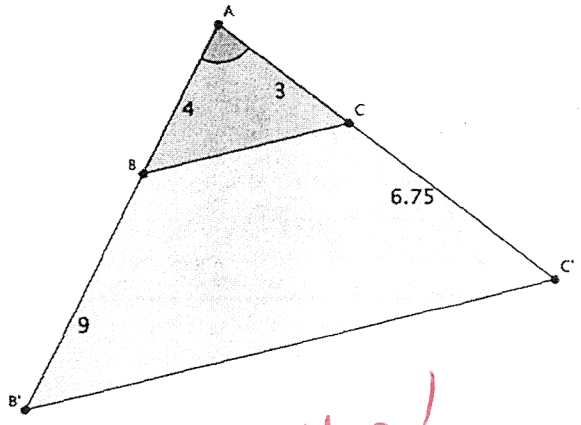


no.

Triangle Similarity Criteria	Describe
SAS~	Two triangles are similar if one pair of corresponding angles are congruent and the corresponding sides adjacent to that angle are in proportion.

Are the triangles below similar? Explain.

a. Is $\Delta ABC \sim \Delta AB'C'$?



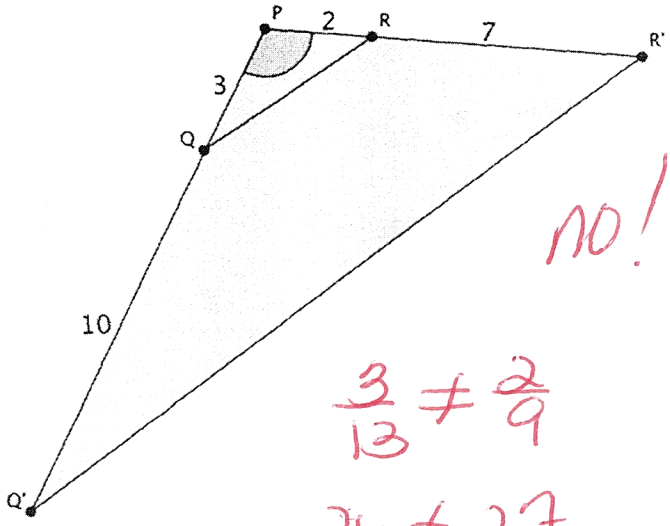
$\frac{4}{13} = \frac{3}{9.75}$

$39 = 39$

Yes! cross products are = ∴ sides are in proportion

$\Delta ABC \sim \Delta AB'C'$ by SAS~

b. Is $\Delta PQR \sim \Delta PQ'R'$?



no!

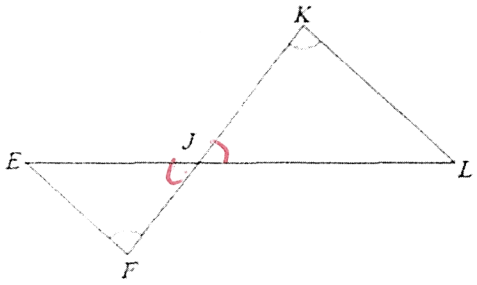
$\frac{3}{13} \neq \frac{2}{9}$

$26 \neq 27$

cross-products are not = so ∴ sides are not in proportion

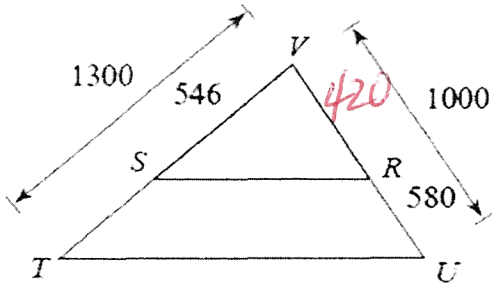
PRACTICE: Determine if the triangles in each pair are similar. If so, state how you know they are similar.

1.



A) similar; SSS similarity
B) similar; SAS similarity
C) similar; AA similarity
D) not similar

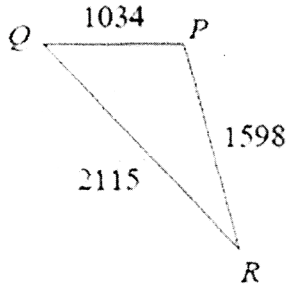
2.

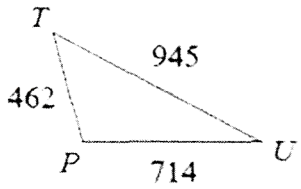


$\frac{546}{1300} = \frac{420}{1000}$

A) similar; AA similarity
B) similar; SSS similarity
C) not similar
D) similar; SAS similarity

3.

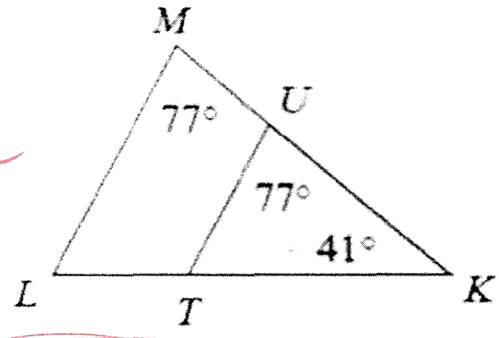




$\frac{2115}{945} = \frac{1598}{714} = \frac{1034}{462}$

A) similar; AA similarity
B) not similar
C) similar; SSS similarity
D) similar; SAS similarity

4.



A) similar; AA similarity
B) not similar
C) similar; SSS similarity
D) similar; SAS similarity

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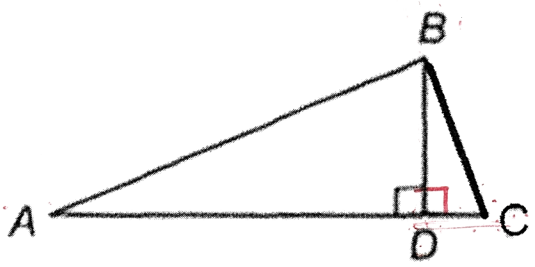
5. In the figure, $\angle ADB$ is a right angle. Which of the following would ***not*** be sufficient to prove that $\Delta ADB \sim \Delta CDB$?

1) $\frac{AD}{BD} = \frac{BD}{CD}$ SAS~

2) $\frac{AB}{BC} = \frac{BD}{CD}$

3) $\angle ABD \cong \angle C$ AA~

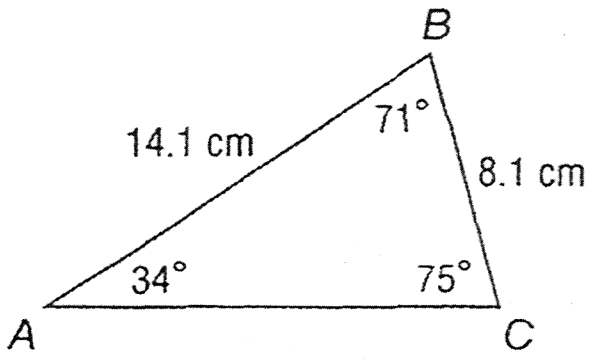
4) $\frac{AD}{BD} = \frac{BD}{CD} = \frac{AB}{BC}$ SSS~



Name: _____ Date:_____

Applying Similarity of Triangles – AA~, SAS~, SSS~ **EXIT TICKET** Geo CC (Mod2 – L3a)

Draw a triangle that is similar to ΔABC shown. Explain how you know that it is similar.



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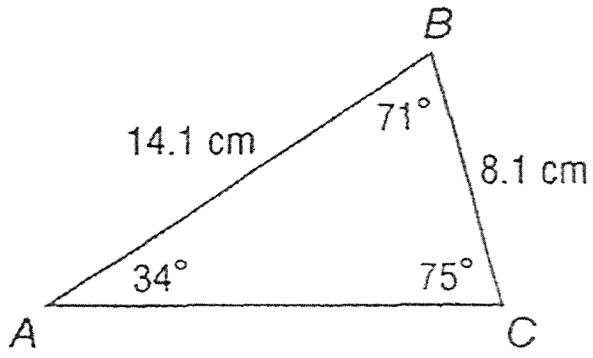
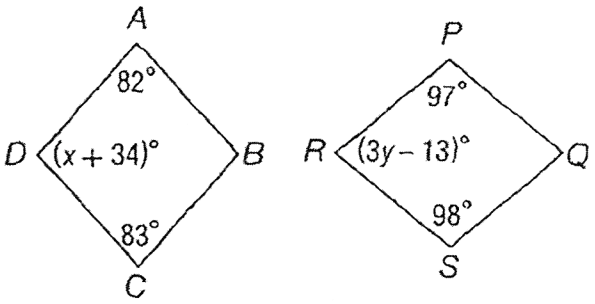


Name: _____ Date: _____

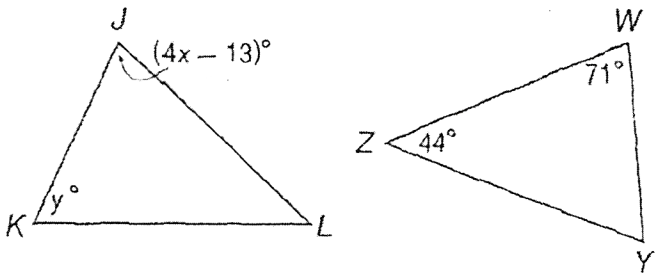
Applying Similarity of Triangles – AA~, SAS~, SSS~ **HOMEWORK** Geo CC (Mod2 – L3a)

1. Find the value of each variable

a. $ABCD \sim QSRP$



b. $\Delta JKL \sim \Delta WYZ$



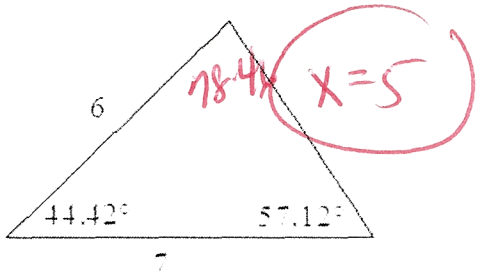
2. Are the triangles shown below similar? Explain. If the triangles are similar, identify any missing angle and side length measures.

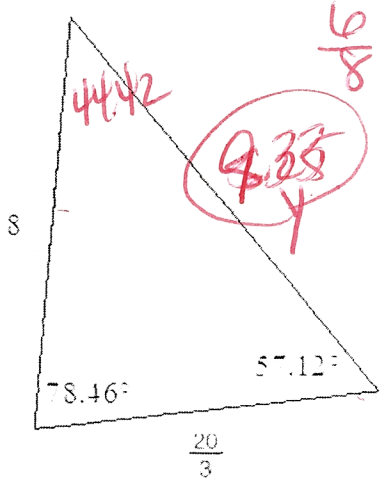
Yes by AA~

$\frac{6}{8} = \frac{x}{\frac{20}{3}}$

$8x = 40$

$x = 5$





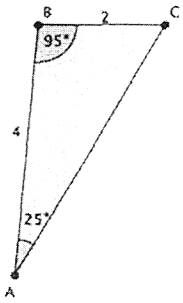
$\frac{6}{8} = \frac{y}{7}$

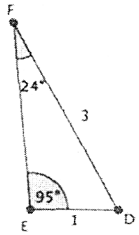
$6y = 56$

$y = 9.33$

3. Are the triangles shown below similar? Explain. If the triangles are similar identify any missing angle and side length measures.

no! only one pair of ∠s =





4. Triangle $A'B'C'$ is the image of ΔABC after a dilation of 2. Which statement is true?

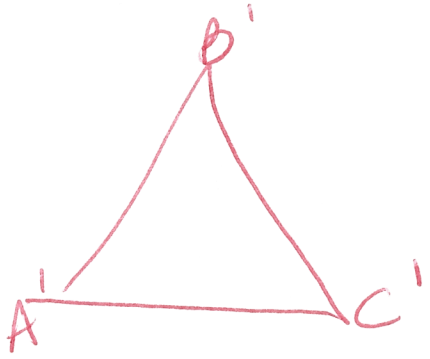
1) $AB = A'B'$

2) $BC = 2(B'C')$

3) $m\angle B = m\angle B'$

4) $m\angle A = \frac{1}{2}(m\angle A')$

angles are preserved.



5. In the figure below, $\angle A \cong \angle C$. Which additional information would ***not*** be enough to prove that $\Delta ADB \sim \Delta CEB$?

1) $\frac{AB}{AD} = \frac{CB}{CE}$

2) $\angle ADB \cong \angle CEB$

3) $\overline{ED} \cong \overline{DB}$

4) $\overline{EB} \perp \overline{AC}$