

## Similarity Notes #1

Name: \_\_\_\_\_

### Ratios and Proportions

The \_\_\_\_\_ of  $x$  to  $y$  is the \_\_\_\_\_ obtained by dividing  $x$  by  $y$ .

Example:  $\frac{x}{y}$

A ratio can be represented in the following ways:

- 1.
- 2.
- 3.

#### Examples:

1. Give each ratio in simplest form:

(a)  $8 : 2$

(b)  $\frac{24}{36}$

(c)  $13xy : 39x$

A \_\_\_\_\_ is an \_\_\_\_\_ stating that two ratios are equal.

Example:  $\frac{1}{2} = \frac{3}{6}$

#### To Solve for an Unknown in a Proportion:

Cross Multiply.

$$\frac{a}{b} = \frac{c}{d} \text{ then } ad = bc$$

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2. Solve for x.

(a)  $\frac{3}{4} = \frac{6}{x}$

(b)  $3 : 5 = 6 : x$

(c)  $2 : (x - 3) = 6 : (x + 5)$

**Now you try!**

3. (a) Reduce:  $\frac{15}{60}$

(b) Solve for x.

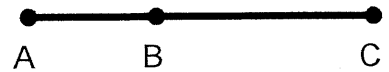
$$\frac{6}{18} = \frac{8}{x}$$

(c) Solve for x.

$$\frac{3}{(x+3)} = \frac{2}{(x+1)}$$

**Examples:**

4. Given:  $AB = 8$  and  $BC = 12$ ; State the following ratios.



(a)  $AB : BC$

(b)  $AC : BC$

(c)  $AB : AC$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. Will the following ratios form a proportion?

(a)  $\frac{6}{24}$  and  $\frac{4}{16}$

\_\_\_\_\_

(b)  $\frac{2}{9} = \frac{3}{10}$

\_\_\_\_\_

6. A segment is divided in the ratio of  $3 : 8$ . If the segment is 44 cm long, find the length of each part of the segment.

\_\_\_\_\_

\_\_\_\_\_

7. Two complementary angles are in the ratio of  $2 : 7$ . Find the measure of each angle.

\_\_\_\_\_

\_\_\_\_\_

## Similarity Notes # 2

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### Similar Polygons

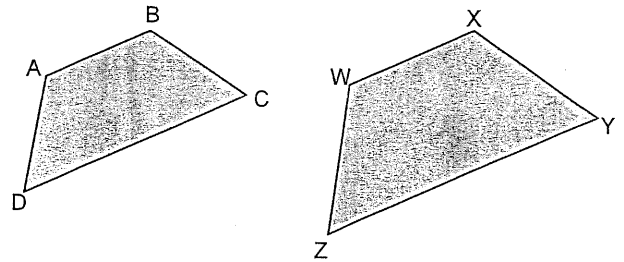
Two polygons are \_\_\_\_\_ ( $\sim$ ) if their vertices can be matched so that:

- Corresponding \_\_\_\_\_ are \_\_\_\_\_.
- Ratios of lengths of corresponding \_\_\_\_\_ are \_\_\_\_\_.

If  $ABCD \sim WXYZ$ , then:

1.  $\angle A \cong \angle W$ ,  $\angle B \cong \angle X$ ,  $\angle C \cong \angle Y$ , and  $\angle D \cong \angle Z$

2.  $\frac{WX}{AB} = \frac{XY}{BC} = \frac{YZ}{CD} = \frac{WZ}{AD}$



**Conversely, if parts 1 & 2 are true, then you can conclude that  $ABCD \sim WXYZ$ .**

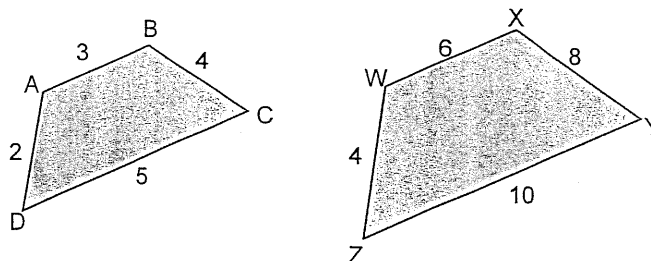
The \_\_\_\_\_ of two similar polygons is the ratio that will transform the first polygon to the second.

*To find the scale factor between two figures, write a ratio using the length of one of the sides of the transformed figure (the second figure) over the length of the corresponding sides of the original figure.*

### Example # 1:

$ABCD \sim WXYZ$ .

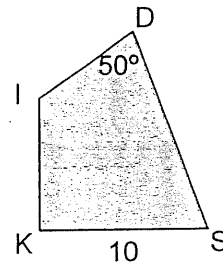
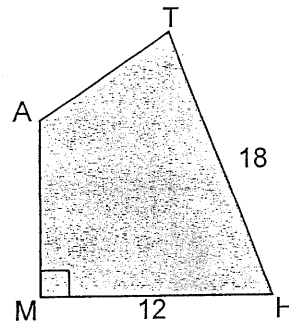
Find the scale factor that will transform the first figure to the second figure.



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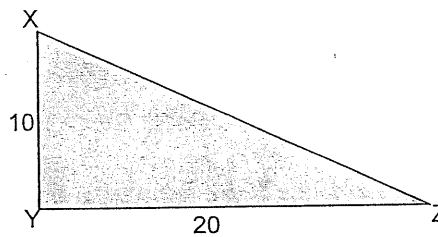
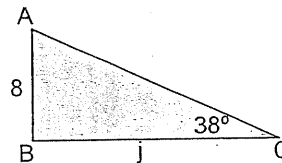
**Example # 2: MATH ~ KIDS**

- (a)  $\angle A \cong$  \_\_\_\_\_
- (b)  $m\angle K =$  \_\_\_\_\_
- (c)  $m\angle T =$  \_\_\_\_\_
- (d)  $\frac{ID}{AT} = \frac{IK}{?}$  ? = \_\_\_\_\_
- (e) *Scale factor* = \_\_\_\_\_
- (f)  $DS =$  \_\_\_\_\_



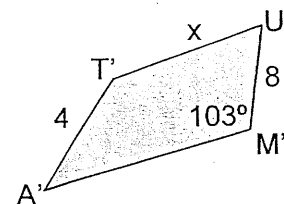
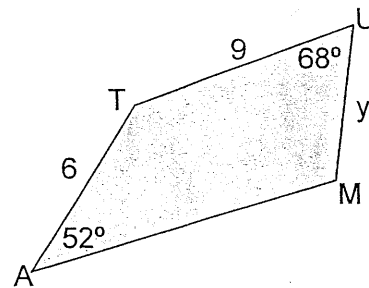
**Now you try!**  
**3.  $ABC \sim XYZ$**

- (a) *Scale factor* = \_\_\_\_\_
- (b)  $j =$  \_\_\_\_\_
- (c)  $m\angle Z =$  \_\_\_\_\_



**4. Quad. TAMU ~ Quad. T'A'M'U'**

- (a) *Scale factor* = \_\_\_\_\_
- (b)  $x =$  \_\_\_\_\_
- (c)  $y =$  \_\_\_\_\_
- (d)  $m\angle U' =$  \_\_\_\_\_

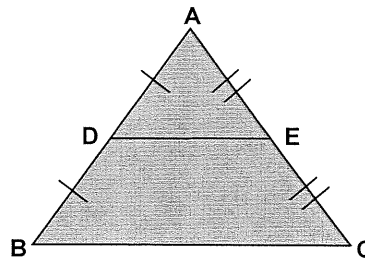


### Similarity Notes # 3

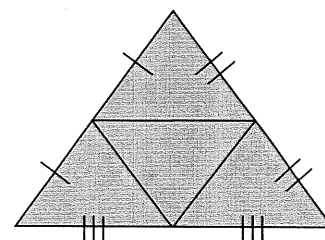
Name: \_\_\_\_\_

### Midsegments of Triangles

**Midsegment:** The segment connecting the \_\_\_\_\_ of two sides of a triangle.

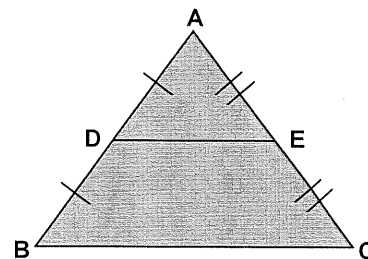


**Conjecture:** The three midsegments of a triangle divide the triangle into \_\_\_\_\_.



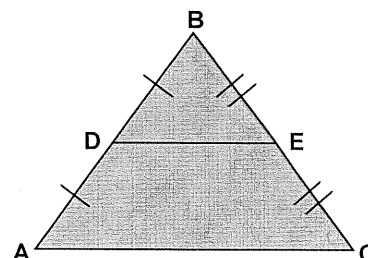
**Conjecture:** A midsegment of a triangle is \_\_\_\_\_ to the 3rd side and \_\_\_\_\_ the length of the third side.

Notation:  $\overline{DE} \parallel \overline{BC}$  and  $2(DE) = BC$



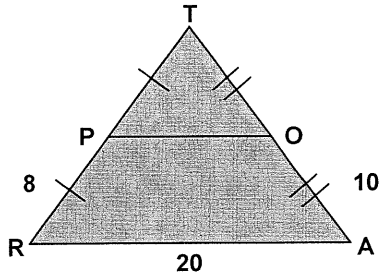
### Guided Practice:

- (a) If  $AC = 20$ , then  $DE =$  \_\_\_\_\_.
- (b) If  $DE = 6$ , then  $AC =$  \_\_\_\_\_.
- (c) If  $DE = x + 6$  and  $AC = 3x + 4$ , then  $x =$  \_\_\_\_\_.



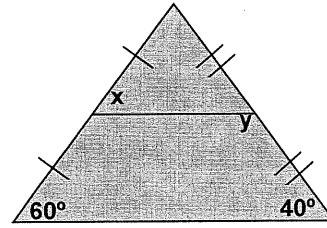
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2. Find the perimeter of  $\triangle TOP$ .

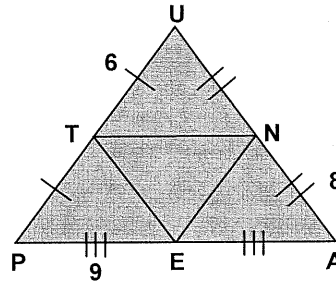


3. Find the missing angle measures.

$x = \underline{\hspace{2cm}}$        $y = \underline{\hspace{2cm}}$

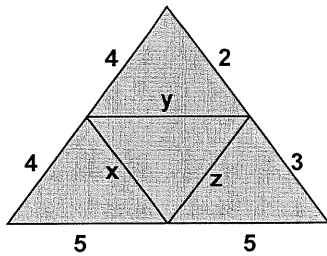


4. Find the perimeter of  $\triangle TEN$ .

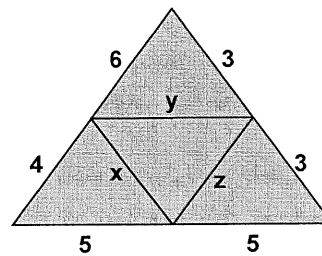


5. Exactly one of the values  $x$ ,  $y$ , or  $z$  can be determined. Find it.

(a)



(b)



# Similarity Notes # 4

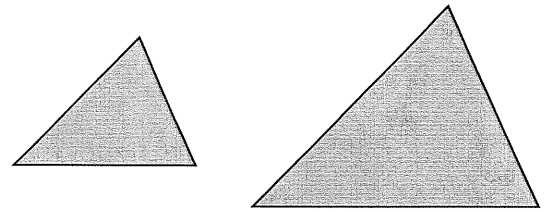
Name: \_\_\_\_\_

## Triangle Similarity

### Angle Angle Similarity:

AA~

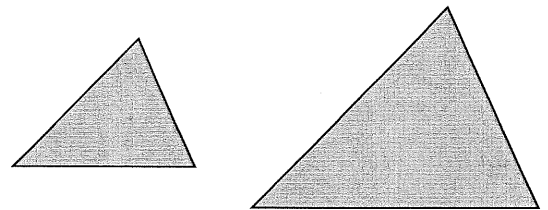
If 2 angles of one triangle are congruent to 2 angles of another triangle, then the triangles are similar.



### Side Side Side Similarity:

SSS~

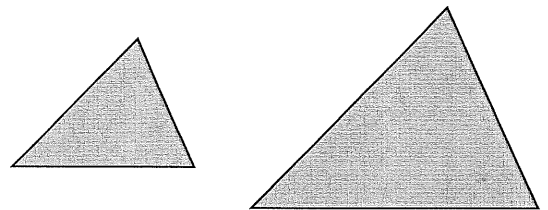
If corresponding sides of two triangles are proportional, then the two triangles are similar.



### Side Angle Side Similarity:

SAS~

If an angle of one triangle is congruent to an angle of another triangle and the sides including those angles are in proportion, then the triangles are similar.



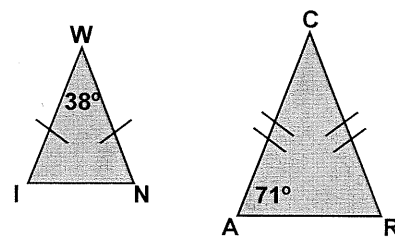
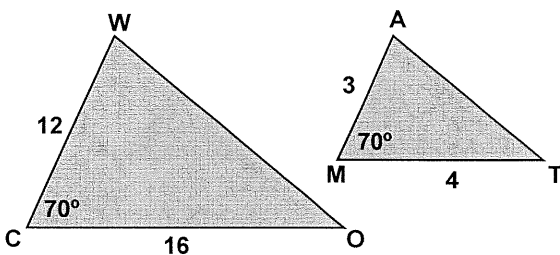
### **Guided Practice**

1. Reason: \_\_\_\_\_

2. Reason: \_\_\_\_\_

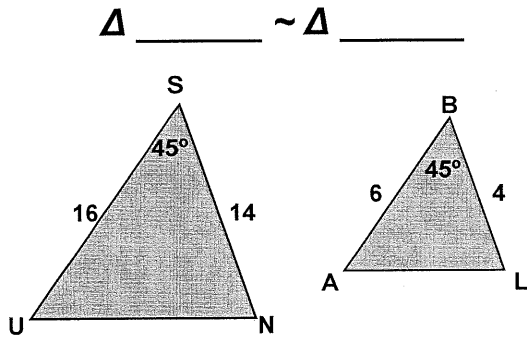
$\Delta$  \_\_\_\_\_  $\sim$   $\Delta$  \_\_\_\_\_

$\Delta$  \_\_\_\_\_  $\sim$   $\Delta$  \_\_\_\_\_

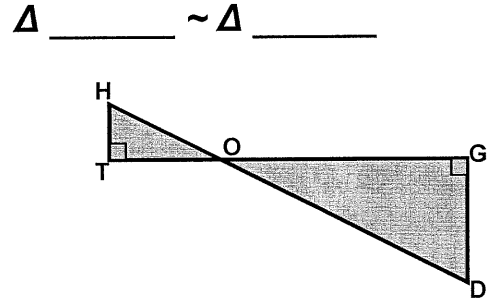


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3. Reason: \_\_\_\_\_



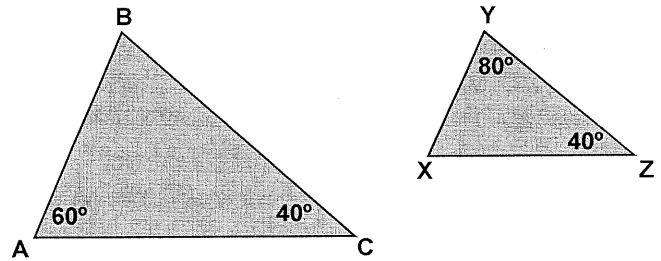
4. Reason: \_\_\_\_\_



Determine if the triangles are similar. If so, state the reason (AA~, SAS~, or SSS~) that would prove this and then complete the similarity statement.

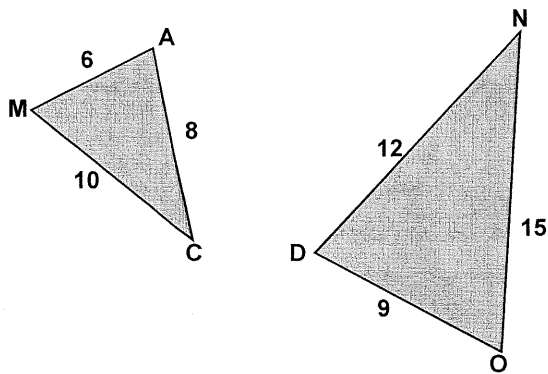
1. Reason: \_\_\_\_\_

$\Delta$  \_\_\_\_\_  $\sim$   $\Delta$  \_\_\_\_\_



2. Reason: \_\_\_\_\_

$\Delta$  \_\_\_\_\_  $\sim$   $\Delta$  \_\_\_\_\_



3. Reason: \_\_\_\_\_

$\Delta$  \_\_\_\_\_  $\sim$   $\Delta$  \_\_\_\_\_

