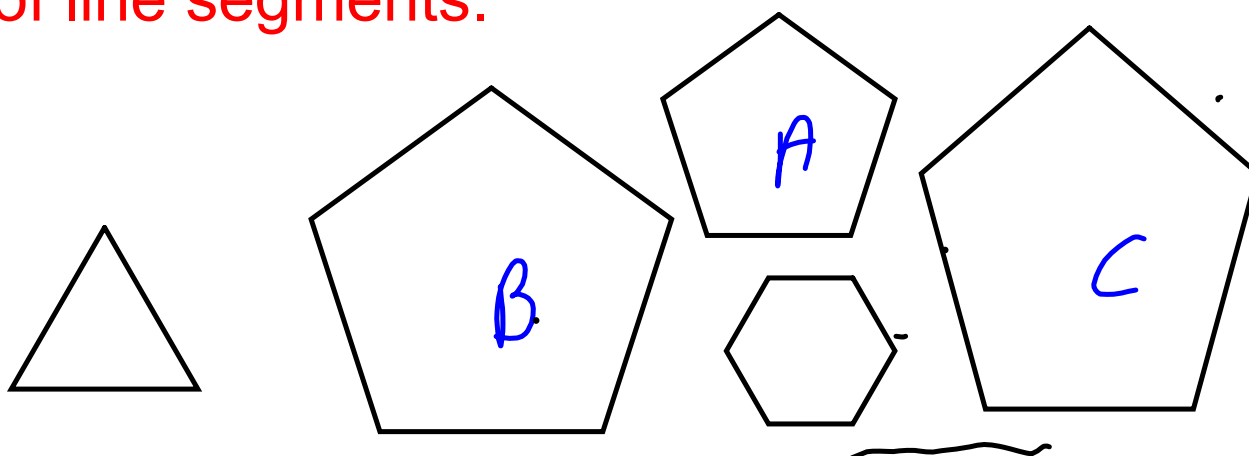


## SECTION 7.3

# SIMILAR POLYGONS

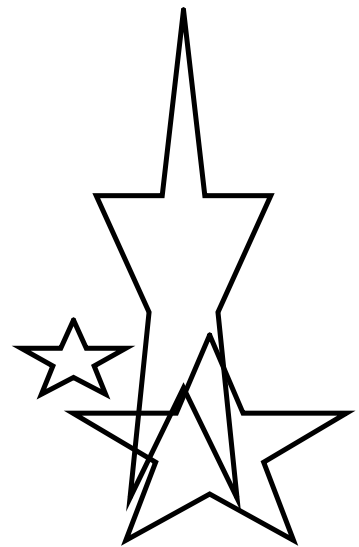
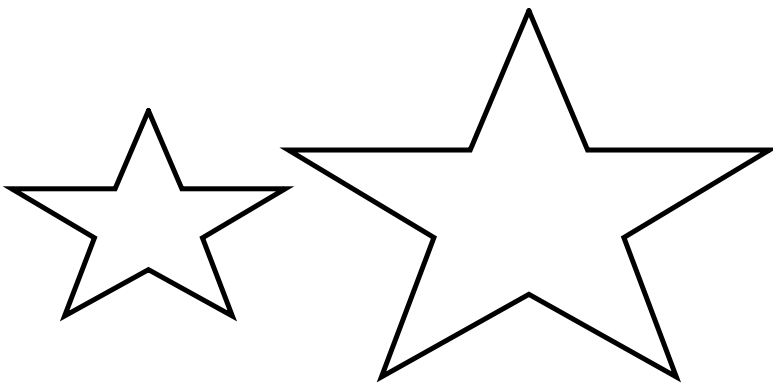
Polygon-is a closed figure made up  
of line segments.



When one polygon is an enlargement or a reduction of another polygon, we say the polygons are **similar**.

Similar polygons have:

1. the same shape, [matching angles to be equal]
2. but not necessarily the same size.



## Check Understanding

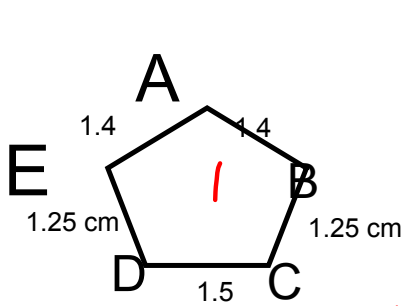
1. A bunny is 20 cm in a diagram and you want to enlarge the picture by a scale factor of 5.5. What will the size of the bunny be?

S.F x original  
 $5.5 \times 20 = 110 \text{ cm}$

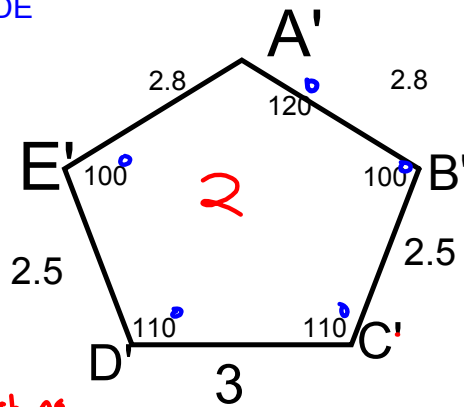
2. Solve

$$\frac{\cancel{3}x}{\cancel{3}} = \frac{15}{7.2} \quad (3)$$

$$x = 6.25$$



Pentagon ABCDE  
is similar to  
A'B'C'D'E'



$$BC = B'C'$$

match.ing

List the corresponding sides

$$AB = 1.4 \quad A'B' = 2.8$$

$$CB = 1.25 \quad C'B' = 2.5$$

$$DC = 1.5 \quad D'C' = 3$$

$$DE = 1.25 \quad D'E' = 2.5$$

$$EA = 1.4 \quad E'A' = 2.8$$

Ratio for corresponding sides

$$\frac{A'B'}{AB} = \frac{2.8}{1.4} = 2$$

$$\frac{C'B'}{CB} = \frac{2.5}{1.25} = 2$$

$$\frac{D'C'}{DC} = \frac{3}{1.5} = 2$$

$$\frac{D'E'}{DE} = \frac{2.5}{1.25} = 2$$

$$\frac{E'A'}{EA} = \frac{2.8}{1.4} = 2$$

List the corresponding angles

$$\angle A = \angle A'$$

$$\angle B = \angle B'$$

$$\angle C = \angle C'$$

$$\angle D = \angle D'$$

$$\angle E = \angle E'$$

Similarity statement

$$ABCDE \sim A'B'C'D'E'$$

$$DEABC \sim D'E'A'B'C'$$

In similar polygons:



☺ Pairs of corresponding sides have lengths in the same ratio, that is, the lengths are proportional [same scale factor]

☺ Corresponding angles are equal

Give a similarity [ ~ ] statement



similarity  
statement

Rectangle

$$\underline{ABCD} \sim XYRZ$$



a) What angle corresponds to  $\angle Z$ ?

$\angle D$

b) what line corresponds to BA?

YX

1. Solve for the unknown in each of the following:

A.  $\frac{x}{3} = \frac{4}{15}$  (3)

$$x = \frac{12}{15}$$

$$x = 0.8$$

B.  $\frac{AB}{4} = \frac{9}{6}$  (4)

$$AB = \frac{36}{6}$$

$$AB = 6$$

C.  $\frac{5}{x} = \frac{6}{10}$

~~(5)~~  $\frac{x}{5} = \frac{10}{6}$  (5)

$$x = \frac{50}{6}$$

$$x = 8.3$$

2. Given the following statement answer the questions below:

**MRTC ~ NGPL**

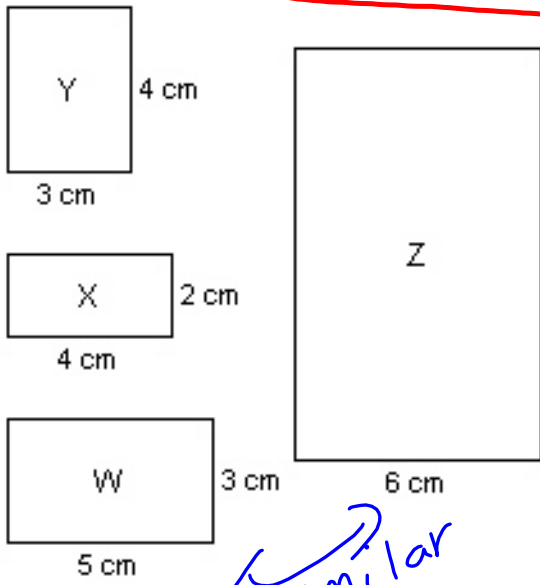
A. What side corresponds to PG?

TR

B. Which angle corresponds to R?

$\angle G$

Identify similar rectangles.



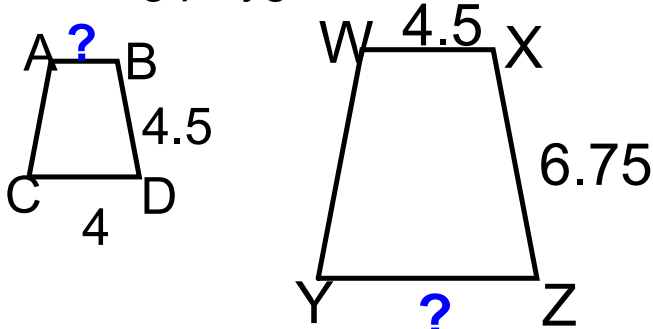
1) Equal ratio corresponding sides

2) Equal corresponding angles [All rectangles have 4, 90° angles]

	long	Short
<b>NO</b> $\frac{Y}{X}$	$\frac{4}{4} = 1$	$\frac{3}{2} = 1.5$
<b>NO</b> $\frac{Y}{Z}$	$\frac{4}{10} = 0.4$	$\frac{3}{6} = 0.5$
<b>NO</b> $\frac{Y}{W}$	$\frac{4}{5} = 0.8$	$\frac{3}{3} = 1$
<b>NO</b> $\frac{Z}{X}$	$\frac{10}{4} = 2.5$	$\frac{6}{2} = 3$
<b>yes</b> $\frac{Z}{W}$	$\frac{10}{5} = 2$	$\frac{6}{3} = 2$
<b>NO</b> $\frac{X}{W}$	$\frac{4}{5} = 0.8$	$\frac{3}{6} = 0.5$



The following polygons are **similar**. Find the unknown side



**Similar means the ratio of corresponding sides MUST be equal**

similarity statement  $ABDC \sim WXZY$

$$\frac{4}{ZY} = \frac{4.5}{6.75}$$

$$\frac{ZY}{4} = \frac{6.75}{4.5}$$

$$ZY = 6$$

$$\frac{AB}{WX} = \frac{BD}{XZ} = \frac{DC}{ZY} = \frac{CA}{YW}$$

$$\frac{AB}{4.5} = \frac{4.5}{6.75} = \frac{4}{ZY} = \frac{CA}{YW}$$

$$\frac{AB}{4.5} = \frac{4.5}{6.75}$$

$$AB = \frac{20.25}{6.75}$$

$$AB = 3$$