SEMINAR NOTES
Learning Guide 14

Similarity PART 2
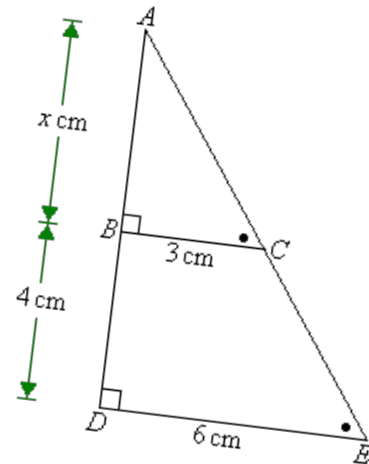
Similar Triangles

B

10cm 75° 16cm

65° 40° C

A 12cm

E

5cm 75° 8cm

65° 40° F

D 6cm

Similar Triangles are the exact Same Shape, but are Different Sizes.

ΔABC ~ ΔDEF   (~ means similar to)

A

x cm

B □ 3 cm • C

4 cm

D □ 6 cm E

Solving a Proportion

When solving a proportion (2 equal ratios), remember that the cross products are also equal.

- Cross multiply with the two fractions and make a new equation.
- Divide by the coefficient of the variable.

Ex. Solve the following proportion.

$$\frac{3}{2} = \frac{x}{8}$$

2 equal ratios? Cross Multiply

Practice: Find the side lengths in each proportion.

$$\frac{3}{10} = \frac{9}{x} \qquad\qquad \frac{2}{8} = \frac{x}{4}$$
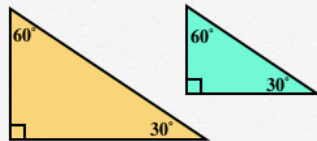
Identifying Similar Figures

The best way to identify whether figures are similar or not is to examine the ratios between corresponding sides. With triangles similar figures also have their corresponding angles equal.

- Write the ratios between corresponding sides and see if they are equal.
- Find the interior angles (of triangles) and see if the corresponding angles are equal.
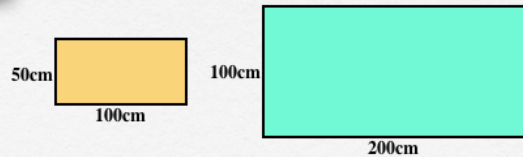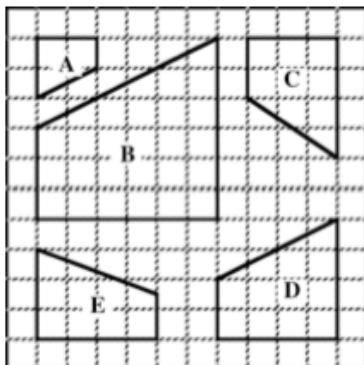
Ex. Are the following triangles similar?

60° 30°
60° 30°

Ex. Are the following rectangles similar?

50cm
100cm
100cm
200cm

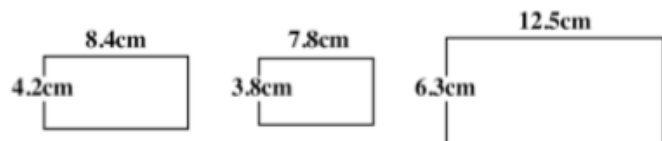**Practice:**

1. Identify which figures are <u>similar</u> figures. Show your working.

A
C
B
E
D

2. Are any of these rectangles similar? Justify your answer.
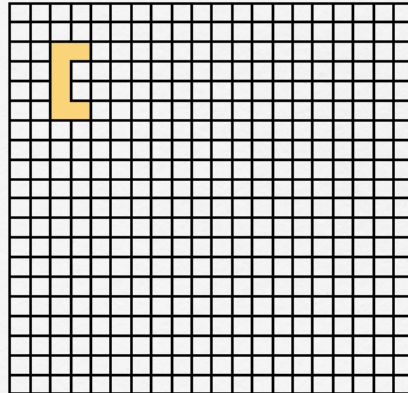
8.4cm
4.2cm

7.8cm
3.8cm

12.5cm
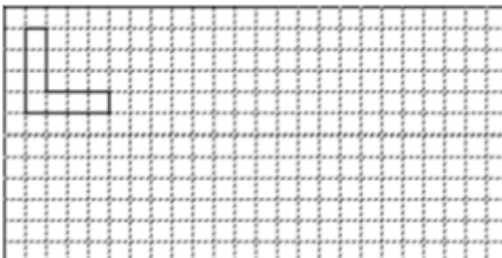6.3cm

Making a Similar Figure

To make a similar figure multiply each dimension by the same scale factor.

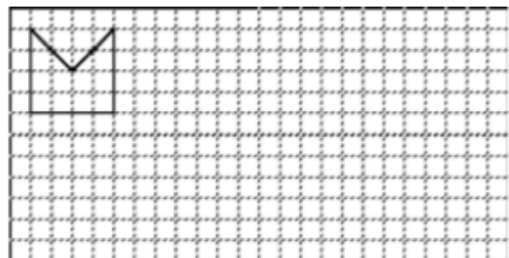**Ex.** Make a figure with a scale factor of 3 times the original.

Practice:

Make this polygon a scale factor of 1/2 of its original.

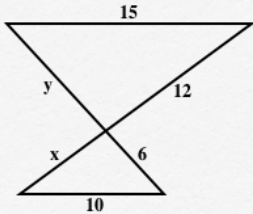Make this polygon a scale factor of 2 times of its original.

Using Equal Ratios to Solve Similar Triangles

If you have similar triangles write the ratios as a proportion (equal fractions).

- Set up the proportion with corresponding sides in the triangles.
- Cross multiply, then divide.

Ex. Given the similar triangles below, solve for x and y.

Practice:

1. A rectangular window has a height of 100cm and a width of 200cm. It is similar to a window on a doghouse whose height is 25 cm. Find the width of the doghouse window.

2. Which of the following pairs of triangles are similar?

Using Equal Ratios to Solve Nested Triangles

If you have nested triangles, draw the triangles as separate figures then write the ratios as a proportion (equal fractions).

- Set up the proportion with corresponding sides in the triangles.
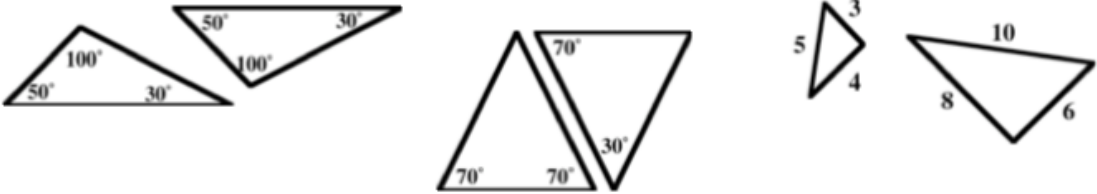- Cross multiply, then divide.

Ex. Given the nested triangles below, solve for x.

x

2.5m

1m   2m

Practice: Assuming the two triangles are similar, find the building's height from the given measurements below.

6 m

20 m   10 m