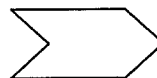


Materials: Ruler, Protractor, graph paper

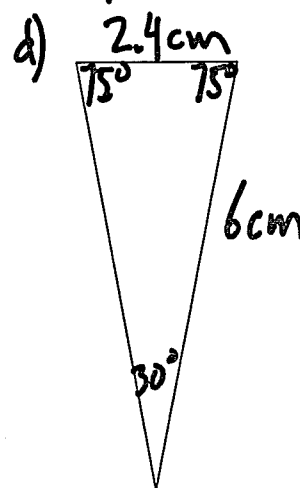
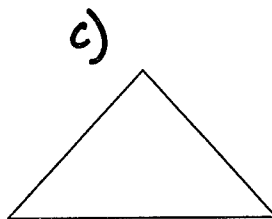
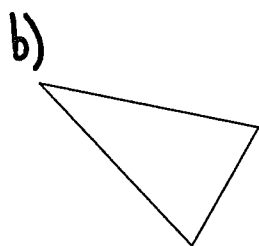
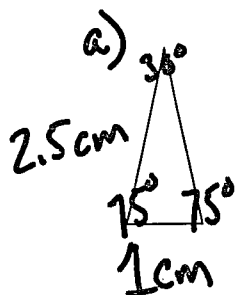
Goals: To determine whether polygons are similar

POLYGON-A many sided figure



Polygons are SIMILAR if they have the same shape

Which of these TRIANGLES are SIMILAR?



Why are they SIMILAR?

A/D are similar

① There are 3 pairs of equal corresponding angles  
i.e/  $30^\circ = 30^\circ$  and  $75^\circ = 75^\circ$

② Write pairs of corresponding sides and calculate the RATIOS

$$\frac{\text{new image}}{\text{original image}} \rightarrow \frac{2.4\text{cm}}{1\text{cm}}$$

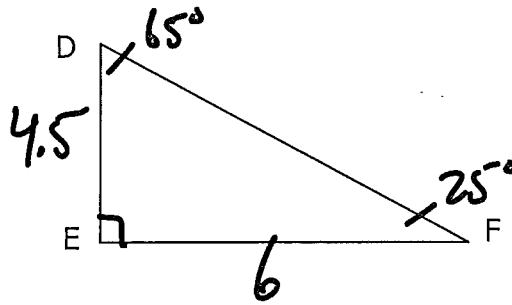
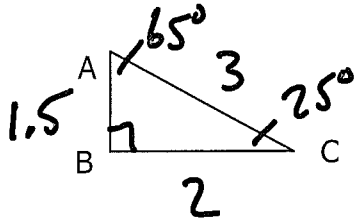
$$\frac{6\text{cm}}{2.5\text{cm}}$$

$$\frac{6\text{cm}}{2.5\text{cm}} \text{ (slant) } = \boxed{2.4}$$

$$\frac{2.4\text{cm}}{1\text{cm}} \text{ (base of } \Delta\text{'s) } = \boxed{2.4}$$

All pairs of corresponding sides are IN RATIO  
 That ratio is  $\boxed{2.4:1}$

Measure the sides and angles of these shapes. What do you notice?



Conclusion: Angles:  $\angle A = \angle D = 65^\circ$ ;  $\angle B = \angle E = 90^\circ$ ;  $\angle C = \angle F = 25^\circ$

Corresponding Angles-

Sides:

$$\frac{EF}{BC} = \frac{DE}{AB}$$

$$= \frac{6}{2} = \frac{4.5}{1.5}$$

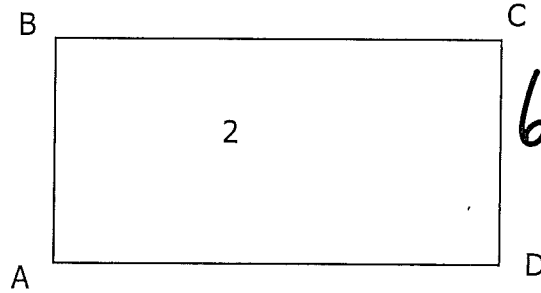
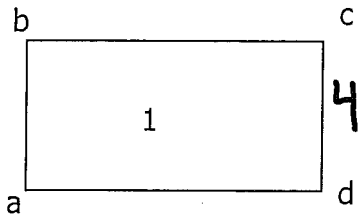
$$= 3 = 3$$

These  $\Delta$ 's are similar because:  
 $\rightarrow$  they have a) 3 pairs of equal angles  
 b) 3 pairs of corresponding sides in ratio

RULE: TWO FIGURES ARE SIMILAR IF....

see a) & b) above  $\rightarrow$

$\frac{3}{2} = 1.5$  or  $\frac{2}{3} = 0.6\bar{6}$   
 ↳ enlargement is  $> 1$       ↳ reduction is  $< 1$



Measure and record the sides of  abcd and  ABCD

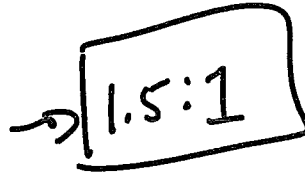
ab corresponds to AB  
 cd corresponds to CD

bc corresponds to BC;  
 da corresponds to DA

The ratio is:  $\frac{6}{4}$  or  $\frac{3}{2}$

Rectangle # 2 is an ENLARGEMENT

The ratio of # 2 to # 1 is 3:2



• If 2 polygons are similar, then the corresponding sides are in ratio

• And the corresponding angles are equal

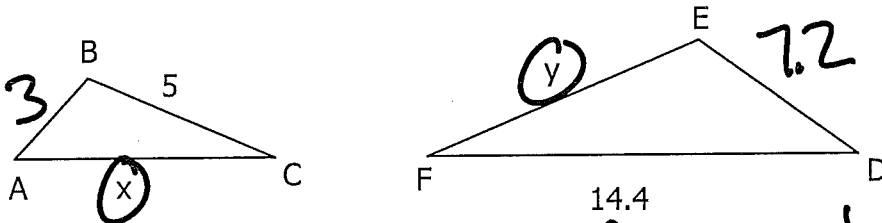
CONCLUSION

TWO OR MORE POLYGONS ARE SIMILAR WHEN THEY ARE EITHER

in ratio OR equal  $\angle$ 's  
 One looks like an enlargement or a reduction of the other

USING THE SIMILAR POLYGON PROPERTY TO FIND A MISSING SIDE

Find the length of \*\*\*\*\*



Find one "complete" pair of corresponding sides

AB corresponds to DE

① Find scale factor  $\rightarrow \frac{DE}{AB} = \frac{7.2}{3} = \boxed{2.4}$

② Find "y"  $\frac{EF}{BC} = \frac{DE}{AB}$  (recall  $\frac{DE}{AB} = 2.4$ )

$\frac{y}{5} = 2.4 \rightarrow y = 2.4 \times 5 = \boxed{12}$

③ Find "x"  $\frac{FD}{CA} = \frac{14.4}{x} = \text{SF of } 2.4$

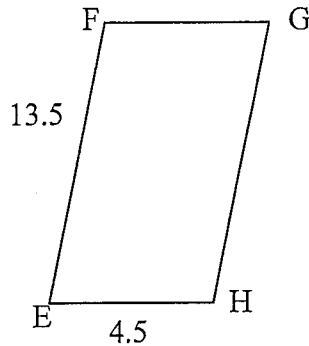
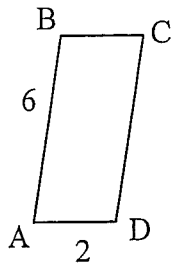
$\frac{14.4}{x} = 2.4 \rightarrow 14.4 \div 2.4 = \boxed{6}$

$\frac{6}{2} = 3$

6 is my 14.4  
x is my 2  
2.4 is my 3

to solve for x using the values I know (14.4/2.4), I can use 6 ÷ 3 so I must divide 6 ÷ 3 to equal 2 which means 14.4 ÷ 2.4 = x

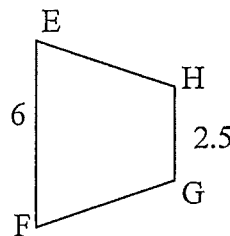
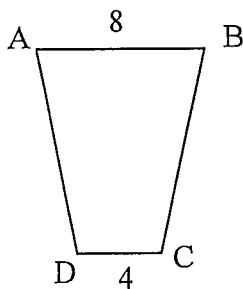
Determine whether the following pairs of polygons are similar



$$\frac{4.5}{2} = 2.25$$

$$\frac{13.5}{6} = 2.25$$

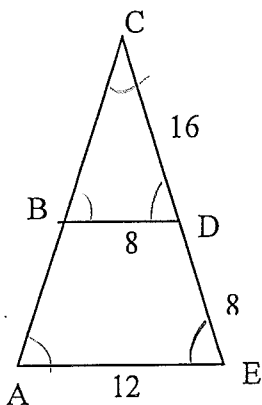
Same scale  
Factor (2.25)  
 $\therefore$  Similar



$$\frac{2.4}{4} = 0.625$$

$$\frac{6}{8} = 0.75$$

Different scale  
Factor (0.625, 0.75)  
 $\therefore$  Not Similar



$$\frac{12}{8} = 1.5$$

$$\frac{24}{16} = 1.5$$

Same scale Factor (1.5)  
and 3 equal angles  $\therefore$  similar.