Unit 6 Notes: Similarity of Figures (pages 253-287)

6.1 – Similar Polygons

Remember the concepts used in Unit 1: **ratio**, **rate**, and **proportional reasoning**?

Ratio: comparison between two numbers measured in the same units.

Rate: comparison between two numbers measured in different units.

Proportional: a fractional statement of equality between two ratios/rates.

Practice which of the following would be a ratio, rate, or proportion.

$\frac{3\ cups}{5\ cups}$ $\frac{\$1}{100g} = \frac{\$1.50}{150g}$ $\frac{7\ ml}{10\ ml}$ $\frac{6\ ml}{10s}$ $\frac{2m}{1hr} = \frac{6m}{3hr}$ $\frac{\$1.45}{8g}$

When dealing with ***similar figures*** (or similar polygons) we use proportions to determine whether they are indeed similar or not.

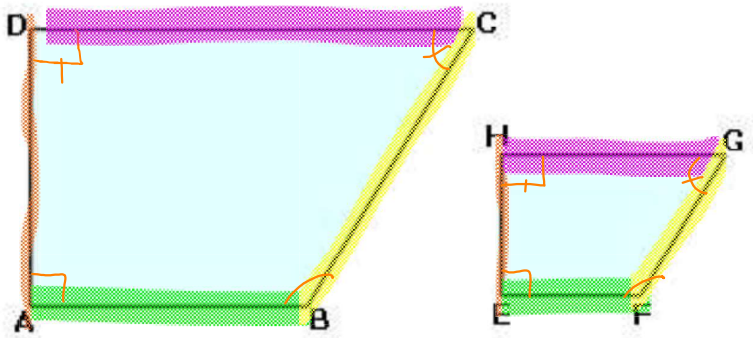
There are two types of similar figures:

1. **Enlargement** – a shape that is *larger* than the original, and has the same proportions as the original.
2. **Reduction** – a shape that is *smaller* than the original, and has the same proportions as the original.

Both types need to have the same proportions. This means for figures to be similar:

1. Corresponding angles must be the same size (equal)
2. Corresponding sides must be in the same proportion

(*See example below for a visual)*



#1

Corresponding angles must be the same size:

<A = <E

<B = <F

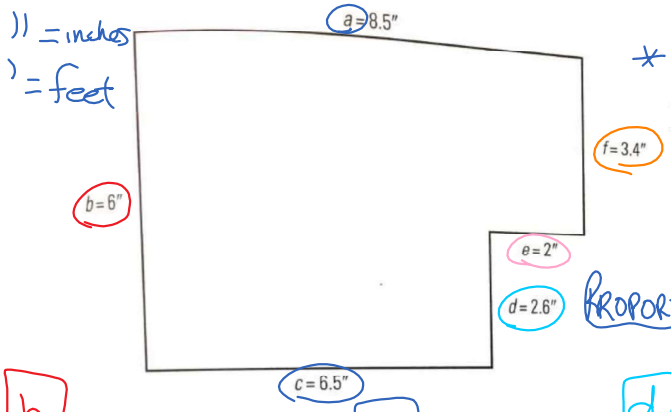
<C = <G

<D = <H

Corresponding sides must be in the same proportions means:

$\frac{AB}{EF} = \frac{BC}{FG} = \frac{CD}{GH} = \frac{DA}{HE}$

Example 1:
Tara has drawn a scale diagram of her bedroom so that she can sketch different arrangements of her furniture. On her diagram, the walls of the following lengths:



* If the longest wall in her room is actually 12.75', how long are the other walls?

longest wall = a
in diagram = 8.5" in real = 12.75'

PROPORTION → $\frac{\text{diagram measurement}}{\text{real measurement}} = \frac{8.5''}{12.75'}$

b: $\frac{8.5''}{12.75'} = \frac{6''}{9'}$

c: $\frac{8.5''}{12.75'} = \frac{6.5''}{9.75'}$

d: $\frac{8.5''}{12.75'} = \frac{2.6''}{3.9'}$

e: $\frac{8.5''}{12.75'} = \frac{2''}{3'}$

f: $\frac{8.5''}{12.75'} = \frac{3.4''}{5.1'}$

**Complete Build Your Skills #1-3 on pages 257-258.*

Example 2:
If ΔRST is similar to ΔLMN are and angle measures of ΔLMN are as follows, what are the angle measures of ΔRST?

<L = 85°

<M = 78°

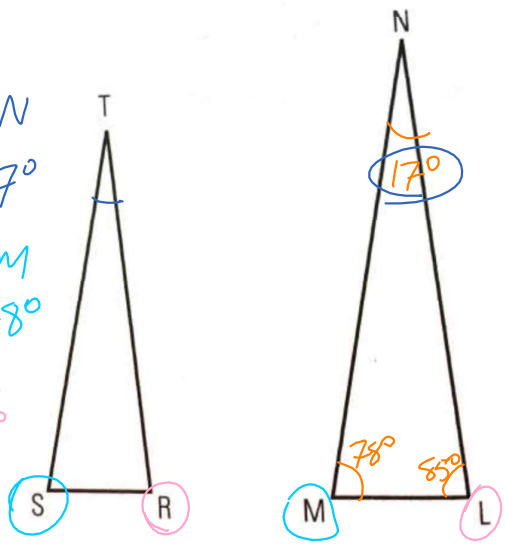
<N=17°

Similar polygons corresponding angles are equal

∠T = ∠N
∠T = 17°

∠S = ∠M
= 78°

∠R = ∠L
= 85°



* **Could you have solved this without being given <N? Explain?

Yes sum of all 3 angles of a triangle = 180°

∠L + ∠M + ∠N = 180°

**Complete Build Your Skills #4-6 on pages 259-260.*

Example 3:

Jason wants to build a model of his house. He will build the model using a scale where 5 cm represents 2 m. If one room is 6.5 m long, 4.8 m wide, and 2.8 m tall, what will its dimensions be in the model?

Scale → $\frac{5\text{cm}}{2\text{m}}$

length → $\frac{5\text{cm}}{2\text{m}} = \frac{1625\text{cm}}{6.5\text{m}}$

WIDTH $\frac{5\text{cm}}{2\text{m}} = \frac{12\text{cm}}{4.8\text{m}}$

Height $\frac{5\text{cm}}{2\text{m}} = \frac{7\text{cm}}{2.8\text{m}}$

***Complete Build Your Skills #7-9 on pages 261-262.*

***Complete Practise Your New Skills #1-5 on pages 262-264.*