MATH NEWS

Grade 7, Module 1, Topic D

LAFAYETTE PARISH SCHOOL SYSTEM

7th Grade Math

Module 1: Ratios and Proportional Relationships

Math Parent Letter

This document is created to give parents and students a better understanding of the math concepts found in Eureka Math (© 2013 Common Core, Inc.) that is also posted as the Engage New York material which is taught in the classroom. Module 1 of Eureka Math (Engage New York) builds on ratios, rates, and unit rates to formally define proportional relationships and the constant of proportionality.

Focus Area Topic D:

Ratios of Scale Drawings

Words to Know:

Scale Drawing - a reduced or enlarged two-dimensional drawing of an original two-dimensional drawing.

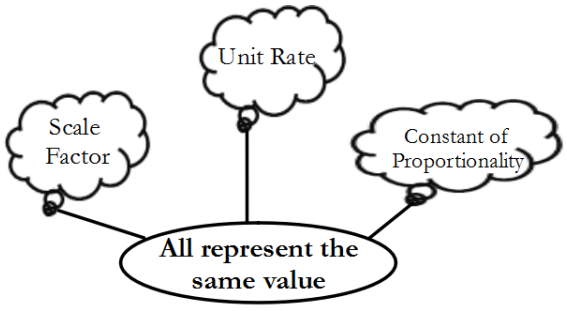
One-to-One Correspondence - Each point in one figure corresponds to one and only one point in the second figure.

Scale Drawing - A drawing in which all lengths between points or figures in the drawing are reduced or enlarged proportional to the lengths in the actual picture. A constant of proportionality exists between corresponding lengths of the two images.

Reduction - The lengths in the scale drawing are smaller than those in the actual object or picture.

Enlargement/Magnification: The lengths in the scale drawing are larger than those in the actual object or picture.

Scale Factor: corresponds to the unit rate and the constant of proportionality. It can be calculated from the ratio of any length in the scale drawing to its corresponding length in the actual picture.

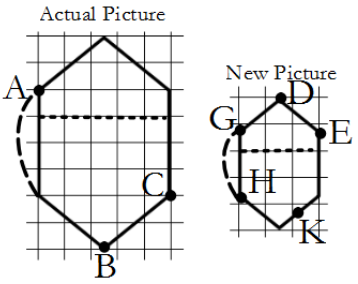


Focus Area Topic D:

Ratios of Scale Drawings

Example Problem and Answer

Use the following figures to answer the questions below:



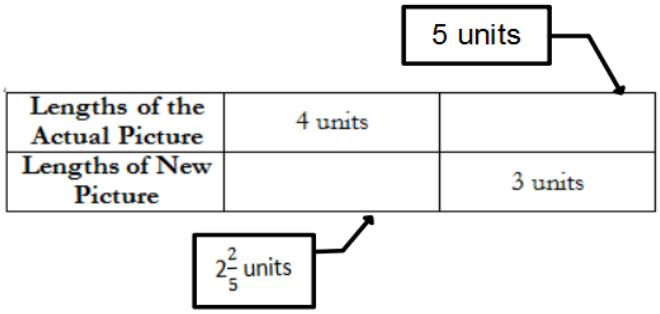
Question: Is the New Picture a reduction or enlargement from the Actual Picture?

Answer: It is a reduction because the New Picture is smaller than the Actual Picture.

Question: Which point on the New Picture corresponds to point A on the Actual Picture?

Answer: Point G; Corresponding points match from one picture to another.

Task: Complete the chart for corresponding measurements.



Question: Does the constant of proportionality exist? If so, how do you know?

Answer: Yes, because there is a constant value $\left(\frac{5}{3}\right)$ to get from each length to its corresponding length. (See work and values below).

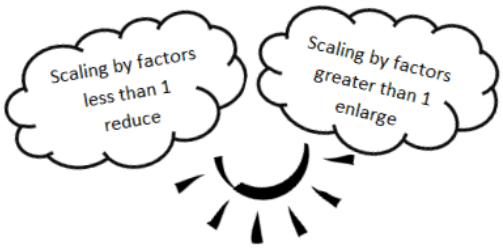
$$\frac{4}{2\frac{2}{5}} = \frac{4 \times \frac{5}{12}}{\frac{12}{5} \times \frac{5}{12}} = \frac{20}{12} = \frac{5}{3}$$

$\frac{5}{3}$

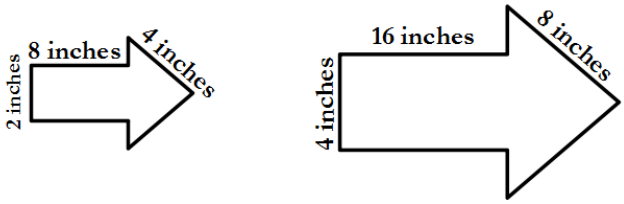
Focus Area Topic D:

Ratios of Scale Drawings

Students learn the term scale factor and recognize the constant of proportionality. With the scale factor, students make scale drawings of pictures and diagrams.



Question:
Given the figures below, find the scale factor.



Answer & Explanation:
The scale factor is 2. Create a ratio of corresponding lengths of the scale drawing to the original drawing.

$$\frac{4}{2} = 2 \qquad \frac{16}{8} = 2 \qquad \frac{8}{4} = 2$$

Question:
Reverse the process. If given the dimensions of the original drawing, compute the dimensions of the scale drawing if the scale factor is $\frac{2}{3}$.

Actual Length	Scale Length
12 inches	$\frac{2}{3} \times 12 = 8$ inches
15 inches	$\frac{2}{3} \times 15 = 10$ inches

Steps to check for proportionality for scale drawing and original object/picture:

1) Measure lengths of scale drawing. Record on table.
2) Measure corresponding lengths on actual picture/drawing. Record on table.
3) Check for constant of proportionality.

Focus Area Topic D:

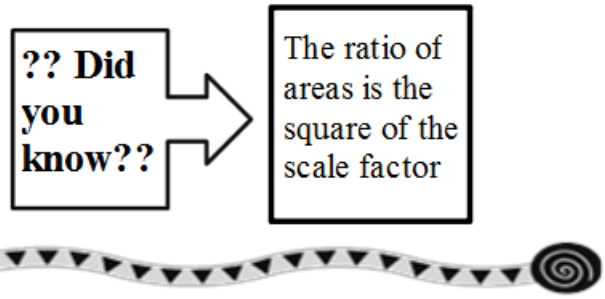
Ratios of Scale Drawings

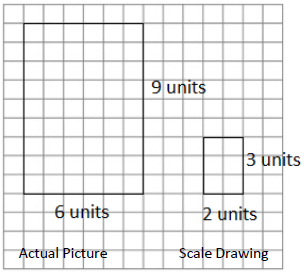
Scale factors are utilized in building models, homes, etc.

Example Problem and Solution
On the Ferris' house blueprints, the master bathroom measures $4\frac{1}{2}$ inches by $8\frac{1}{4}$ inches. If the scale factor for the blueprint is $\frac{1}{4}$ $in = 1$ ft.

Question:
What are the actual dimensions of the master bathroom?

Answer with solution:
$\frac{1}{4}$ *inches per foot* or 4 feet per inch
Therefore: $4\frac{1}{2} \times 4 = \frac{9}{2} \times 4 = 18$ feet
And $8\frac{1}{4} \times 4 = \frac{33}{4} \times 4 = 33$ feet
The master bathroom is 18 feet by 33 feet





The **scale factor** is $\frac{1}{3}$ because the ratio from the scale drawing to the actual drawing is $\frac{2}{6} = \frac{1}{3}$.

The **Actual Area** = 9 units x 6 units = 54 square units
The **Scale Drawing Area** = 2 units x 3 units
= 6 square units
Ratio of Scale Drawing Area to Actual **Area**:

$$\frac{6}{54} = \frac{1}{9}$$

Notice: $\left(\frac{1}{3}\right)^2 = \frac{1}{9}$ … the square (multiplying it times itself) of the scale factor is the ratio of the areas of the scale drawing and the actual picture.

Scale Drawing Process:
1. Measure lengths and widths carefully with a ruler or tape measure. Record in an organized table.
2. Calculate the scale drawing lengths, widths and areas using what was learned in previous lessons.
3. Calculate the actual areas.
4. Begin by drawing the perimeter, windows and doorways.
5. Continue to draw the pieces of furniture making note of placement of objects (distance from nearest wall).
6. Check for reasonableness of measurements and calculations.