Lesson 16: Relating Scale Drawings to Ratios and Rates

Classwork

Opening Exercise: Can You Guess the Image?

1.  2.

**Example 1**

For the following problems, (a) is the actual picture and (b) is the drawing. Is the drawing an enlargement or a reduction of the actual picture?

1. a.b.2. a.

 b.

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

Example 2

****Derek’s family took a day trip to a modern public garden. Derek looked at his map of the park that was a reduction of the map located at the garden entrance. The dots represent the placement of rare plants. The diagram below is the top-view as Derek held his map while looking at the posted map.

What are the corresponding points of the scale drawings of the maps?

Point $A$ to \_\_\_\_\_\_\_\_\_ Point $V$ to \_\_\_\_\_\_\_\_\_\_\_\_ Point $H$ to \_\_\_\_\_\_\_\_\_\_\_\_ Point $Y$ to \_\_\_\_\_\_\_\_\_\_\_\_

Exploratory Challenge

Create scale drawings of your own modern nesting robots using the grids provided.





**Example 3**

Celeste drew an outline of a building for a diagram she was making and then drew a second one mimicking her original drawing. State the coordinates of the vertices and fill in the table.



|  |  |  |
| --- | --- | --- |
|  | Height | Length |
| Original Drawing |  |  |
| Second Drawing |  |  |

Notes:

Exercise

Luca drew and cut out a small right triangle for a mosaic piece he was creating for art class. His mother really took a liking to the mosaic piece and asked if he could create a larger one for their living room. Luca made a second template for his triangle pieces.

|  |  |  |
| --- | --- | --- |
|  | Height | Width |
| Original Image |  |  |
| Second Image |  |  |

1. Does a constant of proportionality exist? If so, what is it? If not, explain.
2. Is Luca’s enlarged mosaic a scale drawing of the first image? Explain why or why not.

Problem Set

Lesson Summary

**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.

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

**figures in the plane, and , are said to be in one-to-one correspondence if there**

**is a pairing between the points in and the points so that, each point of is**

**paired with one and only one point in and, likewise, each point in is paired**

For Problems 1–3, identify if the scale drawing is a reduction or an enlargement of the actual picture.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	1. Actual Picture b. Scale Drawing



1. ****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Actual Picture



1. Scale Drawing
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	1. Actual Picture b. Scale Drawing



1. Using the grid and the abstract picture of a face, answer the following questions:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | $$A$$ | $$B$$ | $$C$$ | $$D$$ |
| $$F$$ |  |  |  |  |
|  $G$ |  |  |  |  |
| $$H$$ |  |  |  |  |
| $$I$$ |  |  |  |  |

* 1. On the grid, where is the eye?
	2. What is located in $DH$?
	3. In what part of the square $BI$ is the chin located?
1. Use the blank graph provided to plot the points and decide if the rectangular cakes are scale drawings of each other.

Cake 1: $(5,3)$,$ (5,5)$,$ (11,3)$, $(11, 5)$

Cake 2: $ (1,6)$, $(1, 12)$,$(13,12)$, $(13, 6)$

How do you know?