

Lesson 16: Relating Scale Drawings to Ratios and Rates

Classwork

Opening Exercise: Can You Guess the Image?

1.



2.

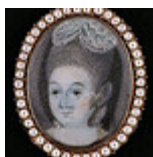


Example 1

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.

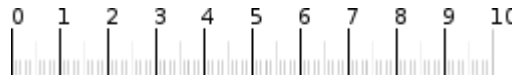


b.

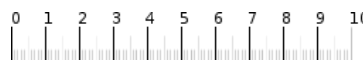


2.

a.



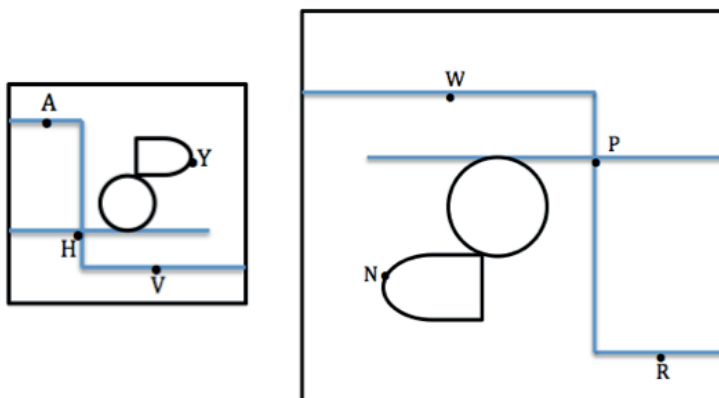
b.



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.

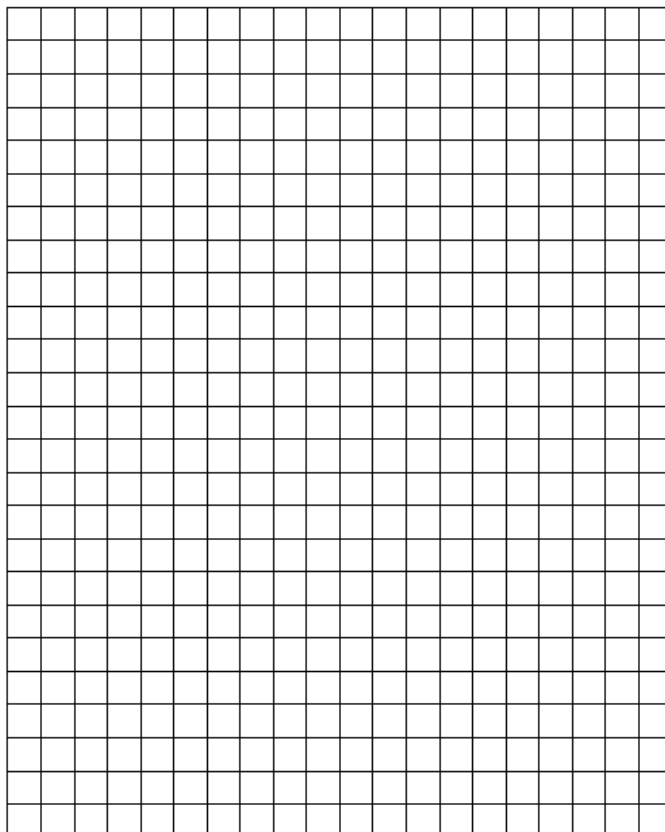
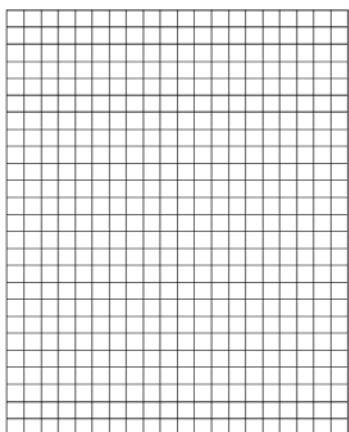
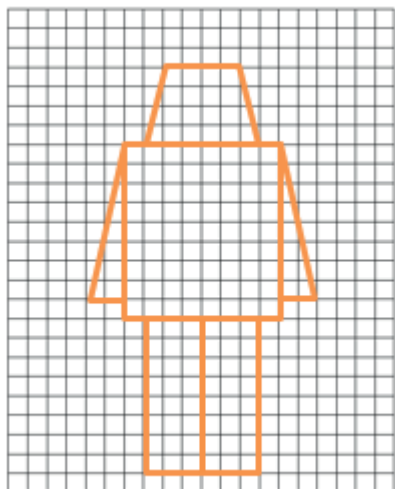


What are the corresponding points of the scale drawings of the maps?

Point *A* to _____ Point *V* to _____ Point *H* to _____ Point *Y* to _____

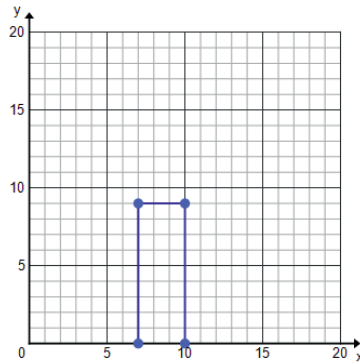
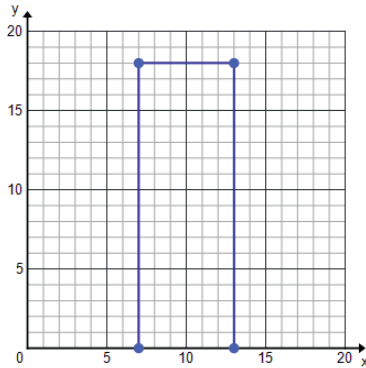
Exploratory Challenge

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.

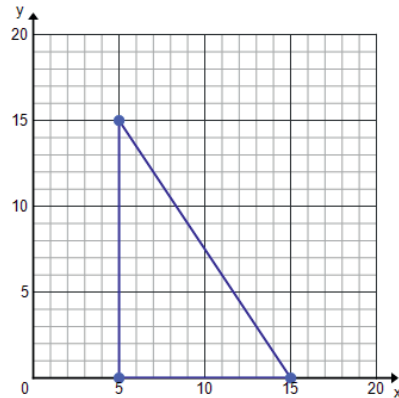
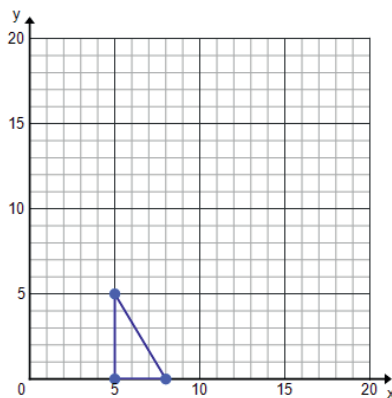


	Height	Length
Original Drawing		
Second Drawing		

Notes:

Exercise

Luca drew and cut out a small right triangle for a mosaic piece he was creating for art class. His mother liked 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		

- Fill in the table. Does a constant of proportionality exist? If so, what is it? If not, explain.
- Is Luca's enlarged mosaic a scale drawing of the first image? Explain why or why not.

Lesson Summary

SCALE DRAWING AND SCALE FACTOR: For two figures in the plane, S and S' , S' is said to be a *scale drawing* of S with *scale factor* r if there is a one-to-one correspondence between S and S' so that, under the pairing of this one-to-one correspondence, the distance $|PQ|$ between any two points P and Q of S is related to the distance $|P'Q'|$ between corresponding points P' and Q' of S' by $|P'Q'| = r|PQ|$.

A scale drawing is an *enlargement* or *magnification* of another figure if the scale drawing is larger than the original drawing, that is, if $r > 1$.

A scale drawing is a *reduction* of another figure if the scale drawing is smaller than the original drawing, that is, if $0 < r < 1$.

Problem Set

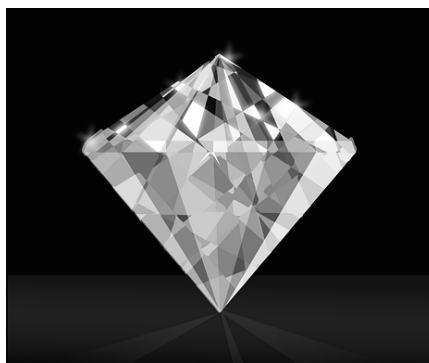
For Problems 1–3, identify if the scale drawing is a reduction or an enlargement of the actual picture.

1. _____

a. Actual Picture

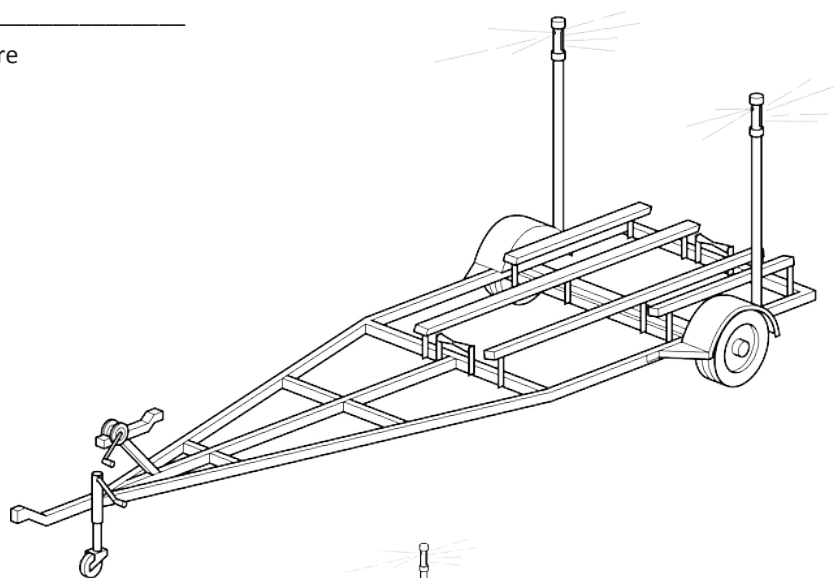


b. Scale Drawing

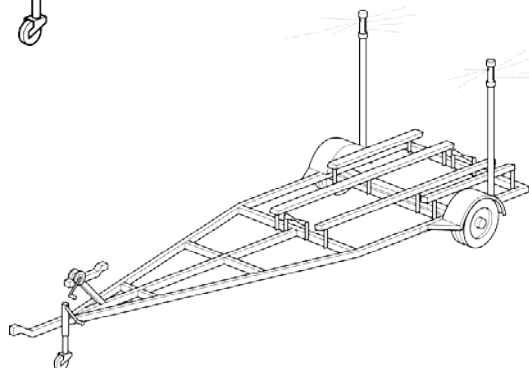


2. _____

a. Actual Picture



b. Scale Drawing



3. _____

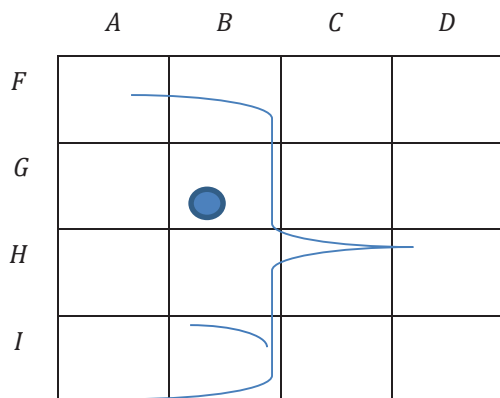
a. Actual Picture



b. Scale Drawing



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



- On the grid, where is the eye?
 - What is located in DH ?
 - In what part of the square BI is the chin located?
5. 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?

