# Lesson 18: Computing Actual Lengths from a Scale Drawing

## Classwork

Example 1: Basketball at Recess?

Vincent proposes an idea to the Student Government to install a basketball hoop along with a court marked with all the shooting lines and boundary lines at his school for students to use at recess. He presents a plan to install a half- court design as shown below. After checking with school administration, he is told it will be approved if it will fit on the empty lot that measures 25 feet by 75 feet on the school property. Will the lot be big enough for the court he planned? Explain.

Scale Drawing: 1 inch on drawing corresponds to 15 feet of actual length

$1\frac{2}{3}$ inches

2 inches
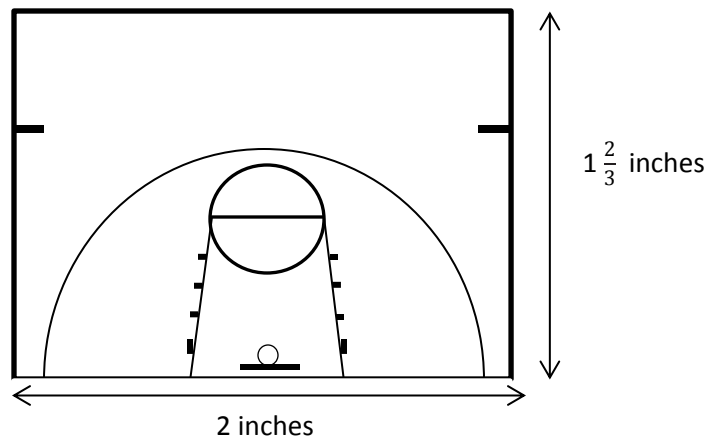
Example 2

The diagram shown represents a garden. The scale is 1 cm for every 20 meters of actual length. Find the actual length and width of the garden based upon the given drawing. Each square in the drawing measures 1 cm by 1 cm.
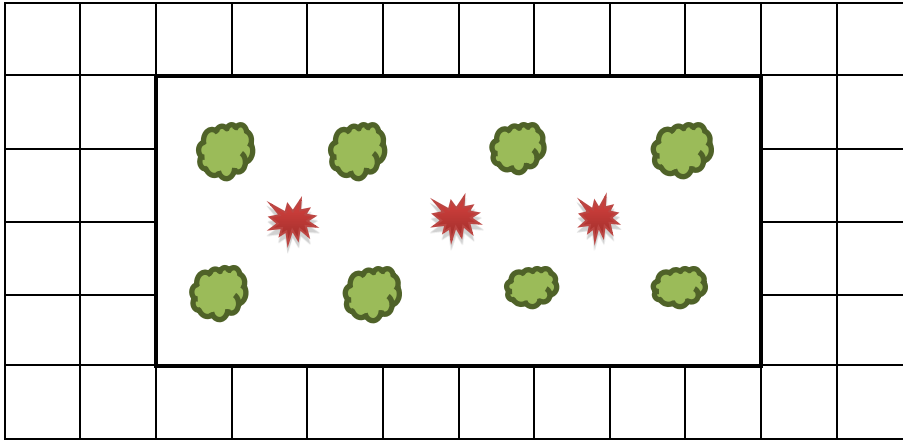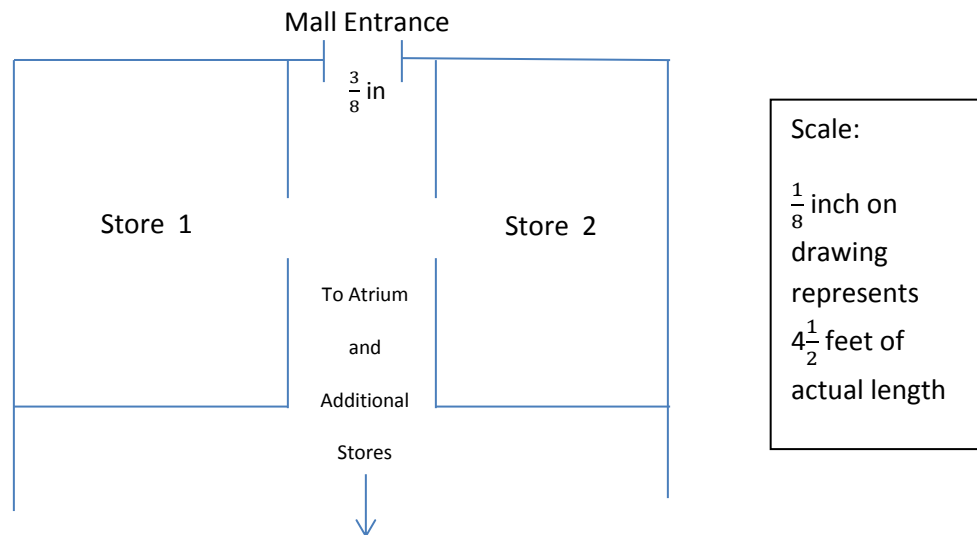
Example 3

A graphic designer is creating an advertisement for a tablet. She needs to enlarge the picture given here so that 0.25 inches on the scale picture will correspond to 1 inch on the actual advertisement. What will be the length and width of the tablet on the advertisement?

Scale Picture of Tablet

Exercises

1. Students from the high school are going to perform one of the acts from their upcoming musical at the atrium in the mall. The students want to bring some of the set with them so that the audience can get a better feel of the whole production. The backdrop that they want to bring has panels that measure 10 feet by 10 feet. The students are not sure if they will be able to fit these panels through the entrance of the mall since the panels need to be transported flat (horizontal). They obtain a copy of the mall floor plan, shown below, from the city planning office. Use this diagram to decide if the panels will fit through the entrance. Use a ruler to measure.

Mall Entrance

$\frac{3}{8}$ in

Store 1

Store 2

To Atrium

and

Additional

Stores

Scale:

$\frac{1}{8}$ inch on drawing represents $4\frac{1}{2}$ feet of actual length

Answer the following questions.

a. Find the actual distance of the mall entrance and determine whether the set panels will fit.

b. What is the scale factor? What does it tell us?

Problem Set

1. A toy company is redesigning their packaging for model cars. The graphic design team needs to take the old image shown below and resize it so that $\frac{1}{2}$ inch on the old packaging represents $\frac{1}{3}$ inch on the new package. Find the length of the image on the new package.

    Car image length on old packaging measures 2 inches

2. The city of St. Louis is creating a welcome sign on a billboard for visitors to see as they enter the city. T he following picture needs to be enlarged so that $\frac{1}{2}$ inch represents 7 feet on the actual billboard. Will it fit on a billboard that measures 14 feet in height?

3. Your mom is repainting your younger brother's room. She is going to project the image shown below onto his wall so that she can paint an enlarged version as a mural. How long wiill the mural be if the projector uses a scale where 1 inch of the image represents $2\frac{1}{2}$ feet on the wall?
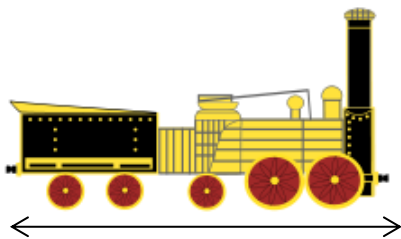
4. A model of a skyscraper is made so that 1 inch represents 75 feet. What is the height of the actual building if the height if the model is $18\frac{3}{5}$ inches?

5. The portrait company that takes little league baseball team photos is offering an option where a portrait of your baseball pose can be enlarged to be used as a wall decal (sticker). Your height in the portrait measures $3\frac{1}{2}$ inches. If the company uses a scale where 1 inch on the portrait represents 20 inches on the wall decal, find the height on the wall decal. Your actual height is 55 inches. If you stand next to the wall decal, will it be larger or smaller than you?

6. The sponsor of a 5K run/walk for charity wishes to create a stamp of its billboard to commemorate the event. If the sponsor uses a scale where 1 inch represents 4 feet and the billboard is a rectangle with a width of 14 feet and a length of 48 feet, what will be the shape and size of the stamp?

7. Danielle is creating a scale drawing of her room. The rectangular room measures $20\frac{1}{2}$ feet by 25 ft. If her drawing uses the scale 1 inch represents 2 feet of the actual room, will her drawing fit on an $8\frac{1}{2}$ in. by 11 in. piece of paper?

8. A model of an apartment is shown below where $\frac{1}{4}$ inch represents 4 feet in the actual apartment. Use a ruler to measure the drawing and find the actual length and width of the bedroom.