

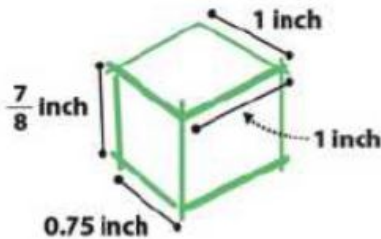
Lesson 17: The Unit Rate as the Scale Factor

Classwork

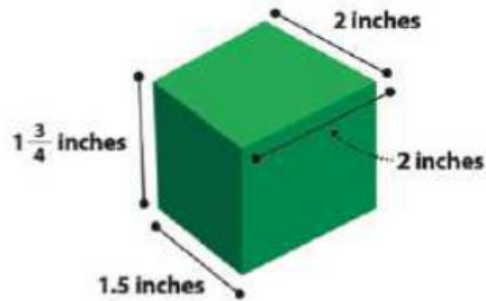
Example 1: Jake's Icon

Jake created a simple game on his computer and shared it with his friends to play. They were instantly hooked, and the popularity of his game spread so quickly that Jake wanted to create a distinctive icon so that players could easily identify his game. He drew a simple sketch. From the sketch, he created stickers to promote his game, but Jake wasn't quite sure if the stickers were proportional to his original sketch.

Original Sketch:



Sticker:



Steps.

- 1) Measure length of scale drawing
Record in table
- 2) Measure corresponding lengths on the actual (original) object
- 3) check for the CoP.

original	(sticker) New	$k = \frac{y}{x}$ $r = \frac{\text{New}}{\text{original}}$
1 inch	2 inch	$\frac{2}{1} = 2$
$0.75 \text{ in} = \frac{3}{4} \text{ in}$	$1.5 \text{ in} = 1\frac{1}{2} \text{ in}$	$\frac{1\frac{1}{2}}{\frac{3}{4}} = 2$
2 in	2 in	$\frac{2}{1} = 2$
$\frac{7}{8} \text{ in}$	$1\frac{3}{4} \text{ in}$	$\frac{1\frac{3}{4}}{\frac{7}{8}} = 2$

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

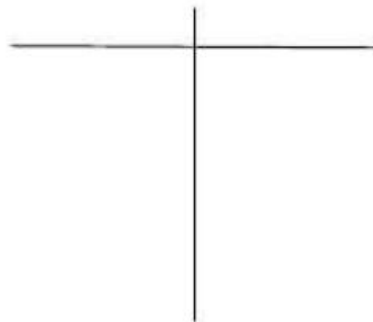
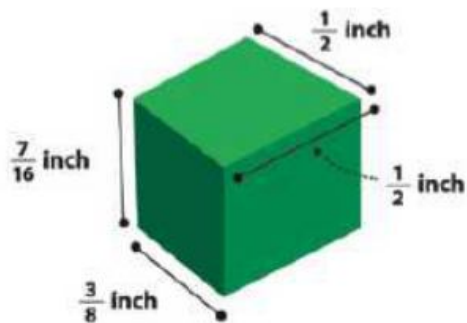
- 1.
- 2.
- 3.

Key Idea:

The **scale factor** can be calculated from the ratio of any length in the scale drawing to its corresponding length in the actual picture. The scale factor corresponds to the unit rate and the constant of proportionality.

Scaling by factors *greater than 1* enlarge the segment, and scaling by factors *less than 1*, reduce the segment.

Exercise 1: App Icon

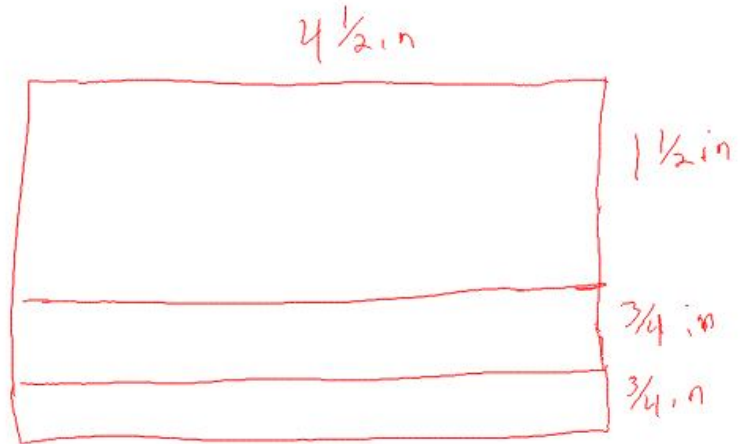


Example 2

$r = 3$

Use a Scale Factor of 3 to create a scale drawing of the picture below.

Picture of the flag of Colombia:



- A) $1\frac{1}{2} \times 3 = 4\frac{1}{2} \text{ in}$
- B) $\frac{1}{2} \times 3 = 1\frac{1}{2} \text{ in}$
- C) $\frac{1}{4} \times 3 = \frac{3}{4} \text{ in}$
- D) $\frac{1}{4} \times 3 = \frac{3}{4} \text{ in}$

Exercise 2

Scale Factor = $\frac{1}{2}$

Picture of the flag of Colombia:



Sketch and notes:

Example 3

Your family recently had a family portrait taken. Your aunt asks you to take a picture of the portrait using your phone and send it to her. If the original portrait is 3 feet by 3 feet, and the scale factor is $\frac{1}{18}$, draw the scale drawing that would be the size of the portrait on your phone.

Sketch and notes:

$3 \text{ ft} = 36 \text{ in}$
 $3 \text{ ft} \times 12 = 36 \text{ in}$
 $36 \text{ in} \times \frac{1}{18} = 2 \text{ in}$
 ↑
 scale factor

Exercise 3

John is building his daughter a doll house that is a miniature model of their house. The front of their house has a circular window with a diameter of 5 feet. If the scale factor for the model house is $\frac{1}{30}$, make a sketch of the circular doll house window.