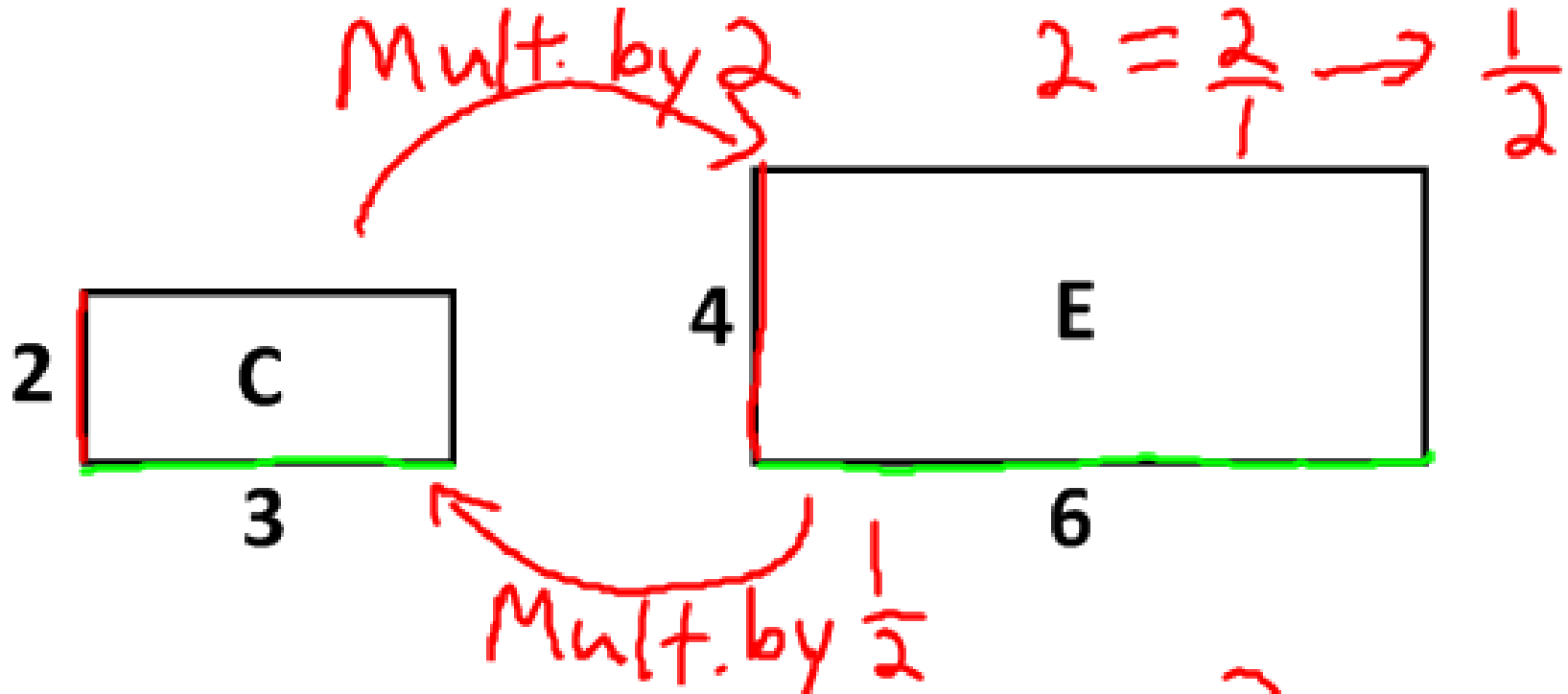
Section 8-4:
Scale & Scale Factor

Scale Factor:

The # you multiply to one object in order to increase or decrease its size.

This maintains "proportionality."



From C to E: Scale Factor = 2

From E to C: Scale Factor = $\frac{1}{2}$

Important Points:

--Scale Factor is just a #, no units

--Write Scale Factor as a fraction or whole #

Scale:

A ratio that tells you how 2 objects compare in size

example 1 in : 15 miles

--Scale is written as a fraction when working in a problem

example 1 in : 15 miles

In the figure below, the scale factor from A to B is $\frac{3}{1}$. → $\frac{1}{3}$

1. Find the length of side BD.

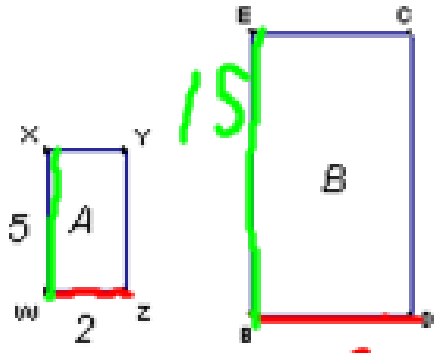
$2 \cdot 3 = 6$

2. Find the length of EB.

$5 \cdot 3 = 15$

3. Find the scale factor from B to A.

$\frac{1}{3}$



Find the scale for the following:

Actual

4. Find model : actual. A house that has a living room with length 16 feet and the blueprint of the same living room has a length of 4 centimeters.

4cm : 16ft $\xrightarrow{\text{Model}}$ $\frac{4}{16} = \frac{1}{4}$ → 1cm : 4ft

5. Find actual : model. A person who is 69 inches tall and whose bobblehead is 7 inches tall.

69in : 7in

Actual

Model

6. The scale of a map is 3 inches : 100 miles. Two cities are 7.5 inches apart on the map. Find the actual distance between the cities.

$\frac{3 \text{ in}}{100 \text{ mi}} \times \frac{7.5 \text{ in}}{x \text{ mi}}$

$\frac{3x}{3} = \frac{750}{3}$

$x = 250 \text{ mi}$

7. A drawing has a scale of 5 cm : 3 m to the actual figure. Find the drawing measurement if the length of the actual figure is 15 meters.

$\frac{5 \text{ cm}}{3 \text{ m}} \times \frac{x \text{ cm}}{15 \text{ m}}$

$\frac{75}{3} = \frac{3x}{3}$

$25 \text{ cm} = x$

8. The scale of a map is $\frac{1}{2}$ ***inch*** **:** **24** ***miles*** .

What is the actual mileage between two cities that are 3 inches apart on the map?

$\frac{0.5 \text{ in}}{24 \text{ mi}} \times \frac{3 \text{ in}}{x \text{ mi}}$

$\frac{0.5x}{0.5} = \frac{72}{0.5}$

$x = 144 \text{ mi}$

9. On a blueprint of a house, the living room is 1 inch long. The actual length of the living room is 24 feet. What is the scale of the blueprint?

1 in : 24 ft

10. In the same blueprint for #9, where the living room is 1 inch long and the actual length of the living room is 24 feet, a hallway on the blueprint is $\frac{1}{4}$ inch wide. Find the actual width of the hallway.

1 in : 24 ft

$$\frac{1\text{ in}}{24\text{ ft}} \times \frac{0.25\text{ in}}{x\text{ ft}}$$

$x = 6$ ft

11. The picture shown is a scale drawing of a collector car. The scale is 1 cm : 72 centimeters. How long is the actual full-sized car?

$\frac{1\text{ cm}}{72\text{ cm}} \nearrow \frac{6.5\text{ cm}}{x\text{ cm}}$

$x = 468\text{ cm}$