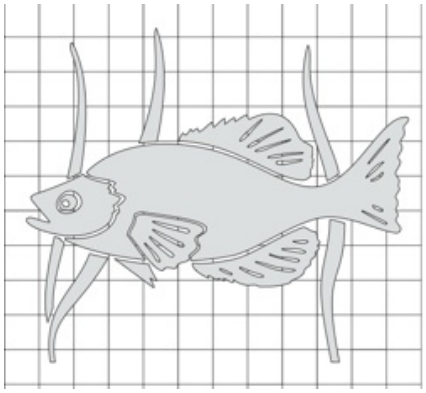
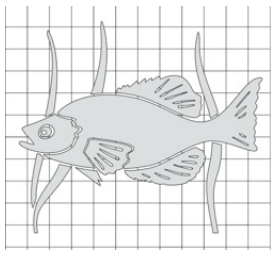
Chapter 7:

Similarity and Transformations



Scale Diagrams:



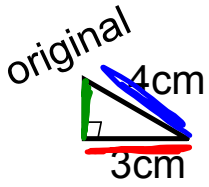
A diagram that is an enlargement or reduction of another diagram.

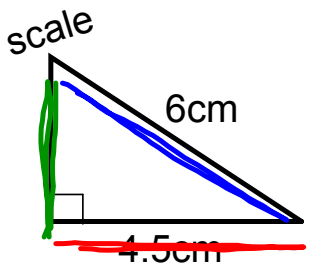
The measurements in each diagram are compared.

$$\text{Scale Factor} = \frac{\textit{Length of Scale Diagram}}{\textit{Length of Original Diagram}}$$

The scale factor can be written as a fraction or decimal.

If the scale factor is less than one, the diagram is a reduction, larger than one indicates the diagram is an enlargement.





Hypotenuse

$\frac{\text{scale}}{\text{original}} = \frac{6}{4}$

$= 1.5$

Leg

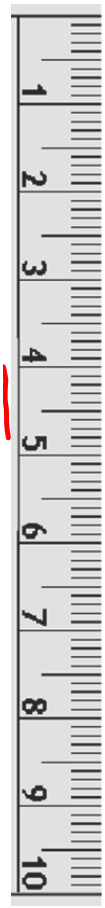
$\frac{\text{scale}}{\text{original}} = \frac{4.5}{3}$

$= 1.5$

When pairs of corresponding lengths have the same scale factor we say that the corresponding lengths are proportional.

width 3.5cm

Determine the scale factor.



original

5 cm length

Scale Factor = $\frac{\text{Scale Diagram}}{\text{Original Diagram}}$

width 2.5cm

scale

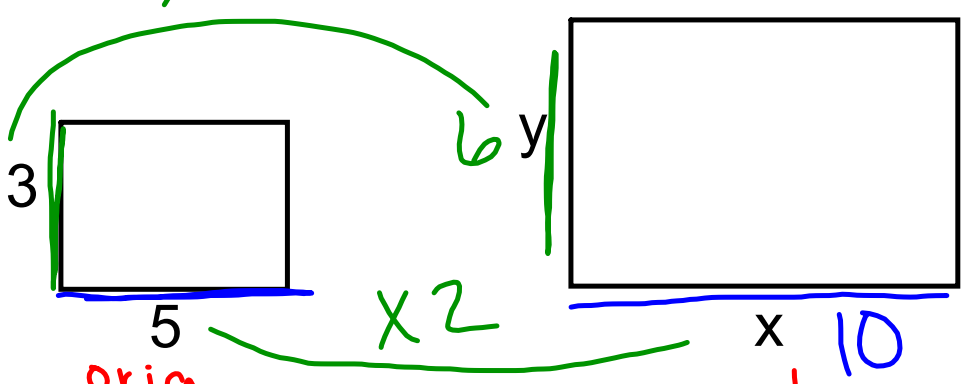
3.5cm length

width

$SF = \frac{2.5cm}{3.5cm} = 0.7\ldots$

length $SF = \frac{3.5cm}{5cm} = 0.7$

SF = 2



orig

scale

$$SF = \frac{\text{scale}}{\text{orig}}$$

$$2 = \frac{x}{5}$$

$$10 = x$$

$$2 = \frac{y}{3}$$

$$6 = y$$

This photo of log houses has dimensions of 9 cm by 6 cm.

The photo is to be enlarged by a scale factor of $\frac{7}{2}$ (scale / original)

Calculate the dimensions of the enlargement

orig.

6 cm

9cm

y

21 cm

31.5cm x

1 $SF = \frac{\text{Scale}}{\text{Orig}}$

$\frac{7}{2} = \frac{y}{6}$ (6)

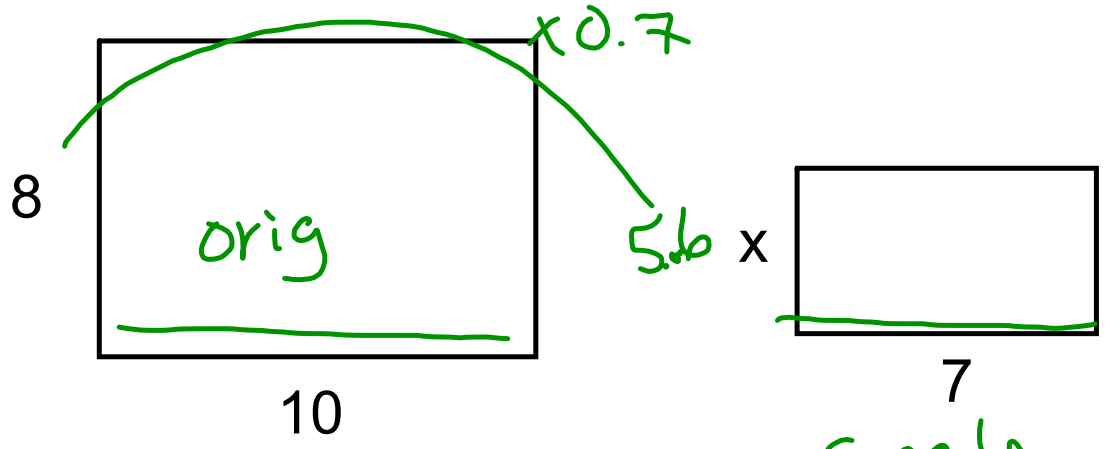
$\frac{42}{2} = y$

$21 = y$

Scale (9) (9)

$3.5 = \frac{x}{9}$

$31.5 = x$



$$SF = \frac{7}{10}$$

$$SF = 0.7$$

Scale

$$0.7 = \frac{x}{8} \quad (5) \quad (8)$$

Sometimes you are only given the scale diagram....

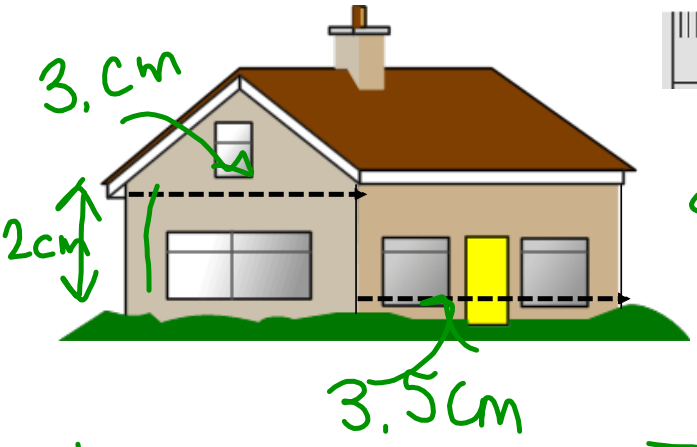
A scale may be given as a ratio

The scale on this scale diagram is 1:150

This means that 1 cm on the diagram represents 150 cm or 1.5 m on the house.

In other words...the scale factor is $\frac{1}{150}$ (scale / orig)

How wide is the actual house??



SF = $\frac{\text{Scale}}{\text{orig}}$

$\frac{1}{150} = \frac{3.5}{x}$

$x = 525\text{ cm}$

$\frac{1}{150} = \frac{3}{x}$

$x = 450\text{ cm}$

$\frac{1}{150} = \frac{2}{}$

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4, 5, 6, 11, 12