

Unit 4: Scale Factors & Similarity

4.2B Scale Diagrams

Scale Diagram:

A proportional representation (enlargement or reduction) of an actual object or original image

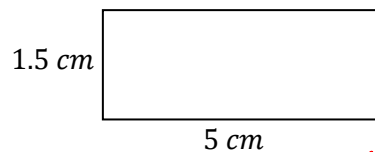
Scale:

comparison (ratio) between the diagram size & the actual size

+ diagram : actual

* often scale is written as 1 : _____

Ex. The scale diagram below uses a scale of 1 : 14. What is the actual length & width?



↑ diagram
↑ actual

$$\begin{aligned} \text{length} \\ \frac{1}{14} &= \frac{5}{l} \\ l &= 14(5) \\ l &= 70 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{width} \\ \frac{1}{14} &= \frac{1.5}{w} \\ w &= 14(1.5) \\ w &= 21 \text{ cm} \end{aligned}$$

Determining Scale Factor & Scale

Ex. An actual Canadian quarter has a diameter of 23.88 mm. The scale drawing shown is a reduction with diameter 1.4 cm.



1.4 cm = 14 mm

a) Determine the scale factor to the nearest hundredth.

$$\begin{aligned} \text{scale factor} &= \frac{\text{diagram}}{\text{actual}} \quad * \text{same units} \\ &= \frac{14}{23.88} = 0.59 \text{ scale factor} \end{aligned}$$

$$\begin{aligned} * 1 \text{ cm} &= 10 \text{ mm} \\ 1 \text{ m} &= 100 \text{ cm} \\ 1 \text{ m} &= 1000 \text{ mm} \\ 1 \text{ km} &= 1000 \text{ m} \end{aligned}$$

b) Determine the scale (write as 1 : _____).

$$\begin{aligned} \text{scale} \quad \text{diagram : actual} \\ \div 14 \quad 14 : 23.88 \quad \div 14 \\ = 1 : 1.71 \text{ scale} \end{aligned}$$

OR

$$\begin{aligned} \frac{14}{23.88} &= \frac{1}{x} \\ x &= \frac{23.88(1)}{14} \\ x &= 1.71 \end{aligned}$$