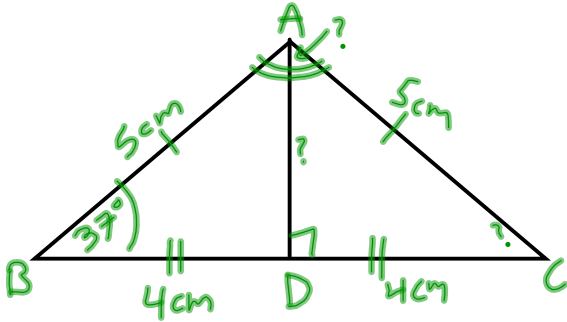


Chapter 7: Similarity and Transformations

Consider the following triangle:



To Solve:

- ① AD
- ② $\angle ACB$
- ③ $\angle BAC$

Answer) $\triangle ACD$ is a right triangle
 \therefore Use Pythagorean Theorem to solve AD

$$a^2 + b^2 = c^2$$

$$4^2 + b^2 = 5^2$$

$$16 + b^2 = 25$$

$$16 + b^2 - 16 = 25 - 16$$

$$b^2 = 9$$

$$b = \sqrt{9}$$

$$b = 3 \text{ cm}$$

* $\angle ACB$

$\triangle ABC$ is isosceles. $\therefore \angle ACB = \angle ABC = 37^\circ$

* Opposite angles in an isosceles \triangle are equal.

* $\angle BAC$: The sum of the angles in a \triangle is 180°

$$\angle BAC + 37 + 37 = 180$$

$$\angle BAC + 74 = 180$$

$$\angle BAC + 74 - 74 = 180 - 74$$

$$\angle BAC = 106^\circ$$

Section 7.1: Scale Diagrams and Enlargements

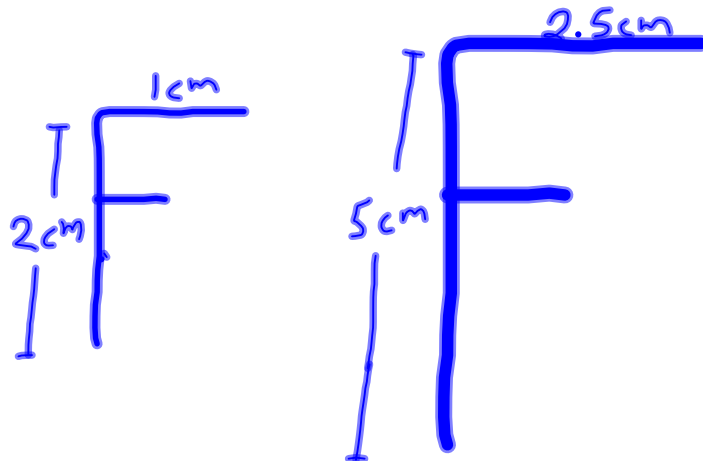
Often times the actual size of an object will not be drawn to scale on a picture. A scale diagram is used to draw a smaller or larger picture of the object.

A diagram that is an enlargement (bigger) or reduction (smaller) of an object is called a scale diagram.

How much an object is enlarged or reduced is called the Scale Factor (SF)

$$\text{Note: Scale Factor} = \frac{\text{Length of Enlargement}}{\text{Length of Original}}$$

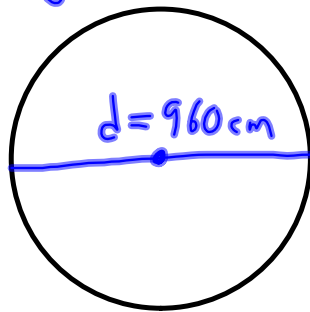
Ex 1 Determine the SF of the following diagrams:



$$\text{Scale Factor} = \frac{\text{Enlargement} - 5\text{cm}}{2\text{cm}} = 2.5$$

Ex #2 Mr. Kennedy goes to a cookie store and buys their biggest cookie. The diameter of the cookie is 48cm.

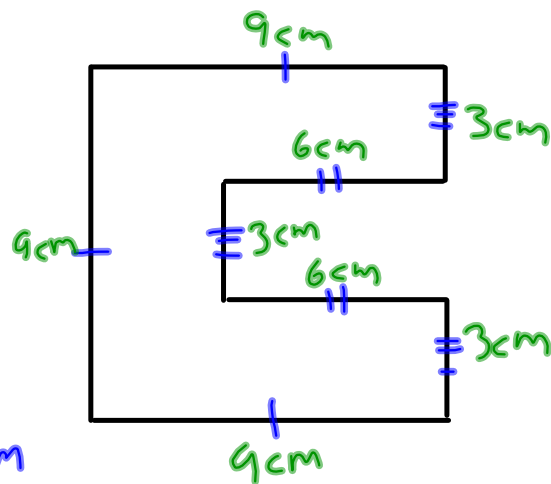
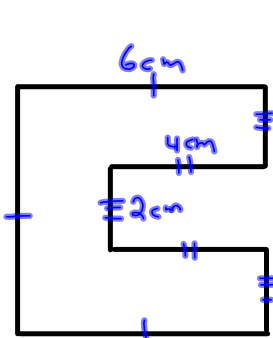
A scale diagram is drawn as shown below:



Question: What is the scale factor?

$$\text{Answer: } Sf = \frac{\text{Scale Diagram}}{\text{Original}} = \frac{960\text{cm}}{48\text{cm}} = 20$$

Ex 3 Draw a scale diagram of this octagon
Use a scale factor of 1.5



ANS) $6\text{ cm} \times 1.5 = 9\text{ cm}$
 $4\text{ cm} \times 1.5 = 6\text{ cm}$
 $2\text{ cm} \times 1.5 = 3\text{ cm}$

Practice: The diameter and scale factors of four different circles are shown in the table below. Determine the diameter of each enlargement.

Diameter of Original Circle	Scale Factor	Diameter of Scale Diagram
8cm	6	$8 \times 6 = 48 \text{ cm}$
40mm	$\frac{15}{4}$	$40 \times \frac{15}{4} = 150 \text{ mm}$
3.5cm	5.8	$3.5 \times 5.8 = 20.3 \text{ cm}$
0.6mm	20.5	$0.6 \times 20.5 = 12.3 \text{ mm}$

Practice #2: The dimensions of a photo of a mountain bike are 15cm by 12cm. An enlargement is to be made for a poster with dimensions 4m by 3.2m

What is the scale factor of the poster to the nearest tenth?