Practice Run

1. Determine the scale factor used in the following situations.

Situation	Scale Factor
The actual height of a mountain is 400 m. The scale diagram shows the height of the mountain as 100 cm.	
The actual width of a window is 40 in. In a scale diagram, the width of the window is $1\frac{1}{2}$ in.	
The actual height of the tallest basketball players in the NBA is 7ft 7 in. In a scale diagram, the same player is 5 in tall.	
The actual width of a nickel is 21 mm. In a scale diagram, its width is 8.4 cm.	

2. The scale diagrams of several circles are to be drawn. The diameter and scale factor of each circle are given. Determine the diameter of each circle in its scale diagram. Identify each scale diagram as an enlargement or a reduction.

Diameter of original circle	Scale Factor	Diameter of circle in scale diagram	Enlargement ✔	Reduction ✔
9 cm	4			
35 mm	$\frac{4}{7}$			
3.5 cm	0.5			
0.9 mm	15.6			

Compare your answers.

1. Determine the scale factor used in the following situations.

Situation	Scale Factor
The actual height of a mountain is 400 m. The scale diagram shows the height of the mountain as 100 cm.	$100 \text{ cm} = 1 \text{ m}$ $k = \frac{1}{400} = 0.0025$
The actual width of a window is 40 in. In a scale diagram, the width of the window is $1\frac{1}{2}$ in.	$k = \frac{1.5}{40} = 0.0375$
The actual height of the tallest basketball players in the NBA is 7ft 7 in. In a scale diagram, the same player is 5 in tall.	$7 \text{ ft } 7 \text{ in} = 7 \times 12 + 7 \text{ in} = 91 \text{ in}$ $k = \frac{5}{91} \doteq 0.055$
The actual width of a nickel is 21 mm. In a scale diagram, its width is 8.4 cm.	$8.4 \text{ cm} = 84 \text{ mm}$ $k = \frac{84}{21} = 4$

2. The scale diagrams of several circles are to be drawn. The diameter and scale factor of each circle are given. Determine the diameter of each circle in its scale diagram. Identify each scale diagram as an enlargement or a reduction.

Diameter of original circle	Scale Factor	Diameter of circle in scale diagram	Enlargement ✔	Reduction ✔
9 cm	4	$k = \frac{\text{scale diagram}}{\text{diameter of circle}}$ $4 = \frac{\text{scale diagram}}{9}$ $4 \times 9 = \text{scale diagram}$ $36 = \text{scale diagram}$ **36 cm**	✔	
35 mm	$\frac{4}{7}$	$k = \frac{\text{scale diagram}}{\text{diameter of circle}}$ $\frac{4}{7} = \frac{\text{scale diagram}}{35}$ $\frac{4 \times 35}{7} = \text{scale diagram}$ $20 = \text{scale diagram}$ **20 mm**		✔

3.5 cm	0.5	$k = \frac{\text{scale diagram}}{\text{diameter of circle}}$ $0.5 = \frac{\text{scale diagram}}{3.5}$ $0.5 \times 3.5 = \text{scale diagram}$ $1.75 = \text{scale diagram}$ **1.75 cm**		✔
0.9 mm	15.6	$k = \frac{\text{scale diagram}}{\text{diameter of circle}}$ $15.6 = \frac{\text{scale diagram}}{0.9}$ $15.6 \times 0.9 = \text{scale diagram}$ $14.04 = \text{scale diagram}$ **14.04 mm**	✔	