check your notes!

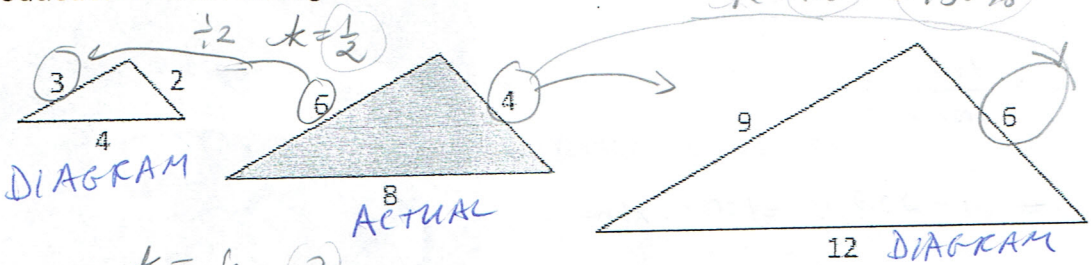
Name: _____

Chapter 8.5: Similar Objects: Scale Models and Scale Diagrams

Recall: What does it mean for objects to be **similar**? ° corresponding angles are EQUAL
" sides are PROPORTIONAL

Are the following triangles similar? (The actual triangle is grey while the others are a reduction and an enlargement.)

Note: 3 ways to write k, linear scale factor:
- fraction,
- decimal,
- percent



$k = \frac{6}{3} = 2$

$k = \frac{4}{2} = 2$

$k = \frac{8}{4} = 2$

$k = \frac{9}{6} = 1\frac{3}{6} = 1.5$

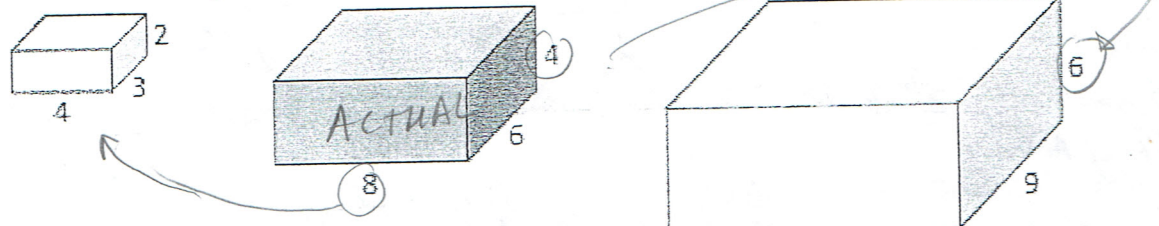
$k = \frac{6}{4} = 1.\frac{2}{4} = 1.5$

$k = \frac{12}{8} = 1\frac{4}{8} = 1.5$

* scale factor the SAME for all sides

* k

Are the following 3D objects similar?



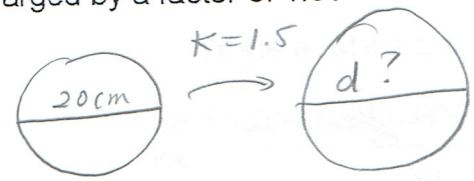
$k = \frac{1}{2}$ for all 3 dimensions

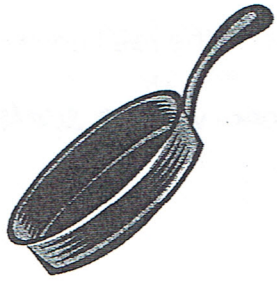
$k = \frac{6}{4} = 1.5$ for all 3 dimensions

∴ Yes, similar because all corresponding ANGLES are EQUAL & " " SIDES are PROPORTIONAL

Example 1: A frying pan has a diameter of 20 cm. What is the diameter of a similar pan that is enlarged by a factor of 1.5?

Props - pie dish & lid

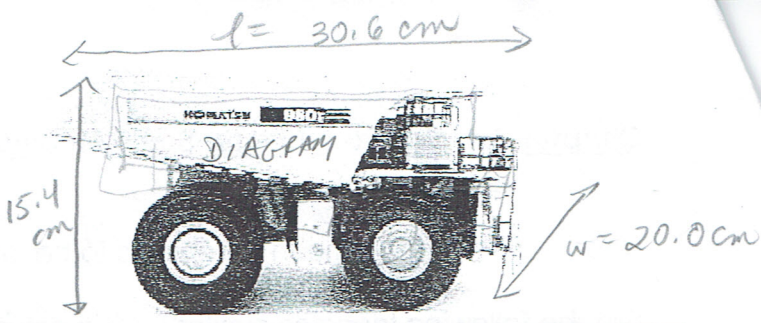


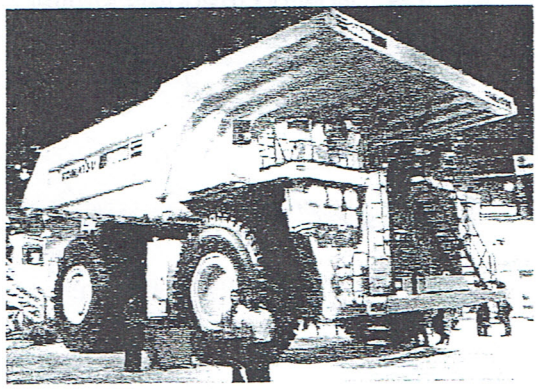


20 cm × 1.5 = 30 cm

∴ the diameter of the larger pan is 30 cm

Example 2: A 1:50 die-cast model of the world's largest dump truck is shown. The model is 30.6 cm long, 20.0 cm wide, and 15.4 cm tall. How long, wide, and tall is the dump truck?





- linear scale factor, k
  $= \frac{\text{Diagram length}}{\text{Actual length}} = \frac{1}{50} = 0.02$
- Truck Length, L
  $\frac{0.02}{1} = \frac{30.6\text{ cm}}{L} \Rightarrow$
  $L = \frac{30.6}{0.02} = 1530\text{ cm} \times \frac{1\text{ m}}{100\text{ cm}} = 15.3\text{ m}$
- Truck Width, W
  $0.02 = \frac{20.0\text{ cm}}{W} \Rightarrow W = \frac{20.0\text{ cm}}{0.02} = 1000\text{ cm} \times \frac{1\text{ m}}{100\text{ cm}} = 10\text{ m}$
- Truck Height, H
  $0.02 = \frac{15.4\text{ cm}}{H} \Rightarrow H = \frac{15.4\text{ cm}}{0.02} = 770\text{ cm} \times \frac{1\text{ m}}{100\text{ cm}} = 7.7\text{ m}$

Assignment for Section 8.5: p. 497 #1ac, 4, 5, 9-11,**14 (Note: Add #14 to assignment organizer).**

Chapter 8.6: Scale Factors and 3D Objects (Part 1)

What is the relationship between a **linear scale factor** and an **area scale factor**?

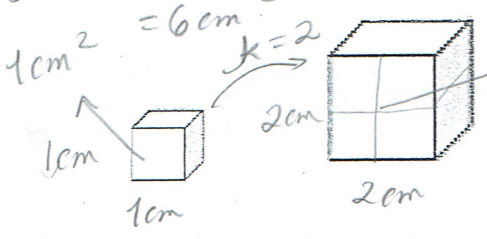
area scale factor, k
$= \frac{\text{Diagram Area}}{\text{Actual Area}} = k^2$

$k \xrightarrow{\text{square}} k^2$
$k^2 \xrightarrow{\text{square root}} k$

What is **surface area**? sum of the areas of each side

Compare the surface areas of a 1-cm cube and a 5 cm cube.

6 sides $\times 1\text{cm}^2 = 6\text{cm}^2$



$6 \times 4\text{cm}^2 = 24\text{cm}^2$
↑ sides

$k^2 = 6$

scale factor, $k = 2$

What is the relationship between **scale factor** and **surface area**?

surface area scale factor $= \frac{\text{Diagram surface area}}{\text{Actual surface area}}$

$= \frac{24\text{ cm}^2}{6\text{ cm}^2} = 4 = 2^2 = k^2$ ☺