Math 2201 **Date:_____**

8.5 Similar Objects: Scale Models and Scale Diagrams

We will now extend our knowledge of scale factors and scale diagrams of 2-D shapes to scale factors and scale diagrams of 3-D objects.

We will use a scale factor to determine unknown measurements of similar 3-D objects.

At the end of the section we will be able to use a given scale factor to determine the unknown dimensions of a 3-D object.

Similar Objects – Two or more 3-D objects that have proportional dimensions.

Example 1:
The dimensions of a scale drawing of a patio chair are 2 cm by 1.5 cm by 4 cm, and a scale factor of 1:30 is applied. Determine the actual dimensions of the patio chair.

$2\text{cm} \times 30 = 60\text{cm}$, $1.5\text{cm} \times 30 = 45\text{cm}$,

or

$4\text{cm} \times 30 = 120\text{cm}$

$k = \frac{\text{scale}}{\text{original}}$

$\frac{1}{30} = \frac{2}{x}$

$x = 2(30)$

$x = 60\text{cm}$

Example 2:
During an Art class, students are projecting the image of a can of Carnation milk on the wall. The projector applies a scale factor of 250%. If the can has a diameter of 10 cm and a height of 12.5 cm, what are the dimensions of the image on the wall?

$\frac{250\%}{100} = 2.5 \leftarrow$ scale factor

diameter: $10\text{ cm} \times 2.5 = 25\text{ cm}$

height: $12.5\text{ cm} \times 2.5 = 31.25\text{ cm}$

or

$K = \frac{\text{scale}}{\text{original}} \rightarrow \frac{2.5}{1} = \frac{x}{10}$ $\quad x = 25(10)$ $\quad x = 25\text{ cm}$

Example 3:
Tony drew a scale diagram of his new skateboard to show a friend. He used a scale factor of 0.4. The scaled diagram has dimensions 3.2 in. by 1.8 in. by 10.8 in. What are the dimensions of the skateboard?

$K = \frac{\text{scale}}{\text{original}}$

$\frac{0.4}{1} = \frac{3.2\text{ in}}{x}$ $\quad \frac{0.4}{1} = \frac{1.8\text{ in}}{x}$ $\quad \frac{0.4}{1} = \frac{10.8\text{ in}}{x}$

$\frac{0.4x}{0.4} = \frac{3.2}{0.4}$ $\quad x = \frac{1.8}{0.4}$ $\quad x = \frac{10.8}{0.4}$

$x = 8\text{ in}$ $\quad x = 4.5\text{ in}$ $\quad x = 27\text{ in}$

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