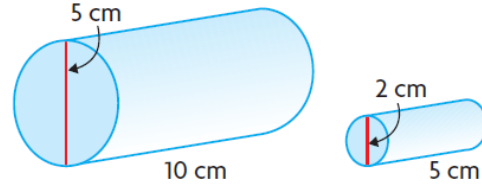
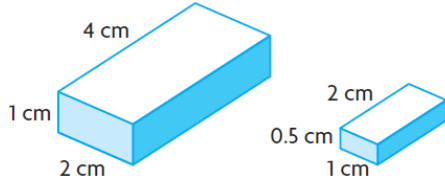


3D Scale Diagrams

Objectives:

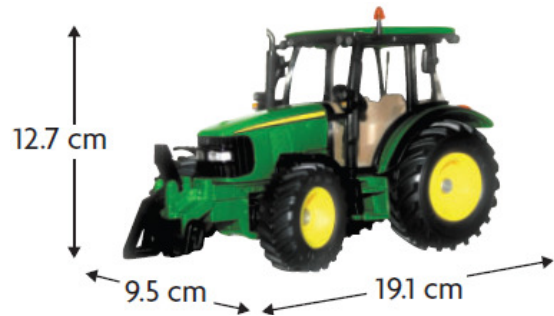
- Determine if two objects are similar
- Use a scale to calculate the actual size of 3D objects
- Use a scale to calculate the Surface Area and Volume of a 3D shape

Are the following pairs of shapes similar?

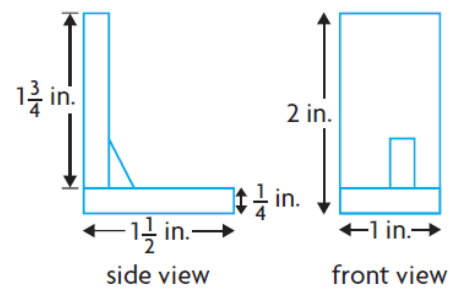


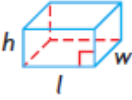
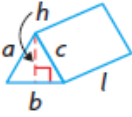
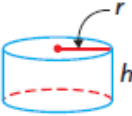
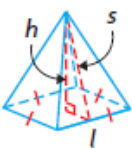
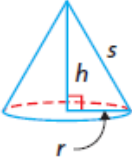
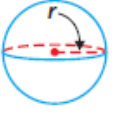
Reminder: scale factor = diagram : actual = $\frac{\text{diagram}}{\text{actual}}$

Esmerelda bought this toy tractor to give to her younger brother for his birthday. The dimensions of the toy are given in the diagram to the right. The scale ratio on the package is 1 : 16. She knows that her brother will want to know the size of the real tractor. How can she determine the dimensions of the real tractor?



Nadia has found plans for a bookend in a woodworking magazine. The plans include a scale diagram, with a scale ratio of 1 : 5. Determine the dimensions (length, width, height, and base thickness) of the actual bookend.

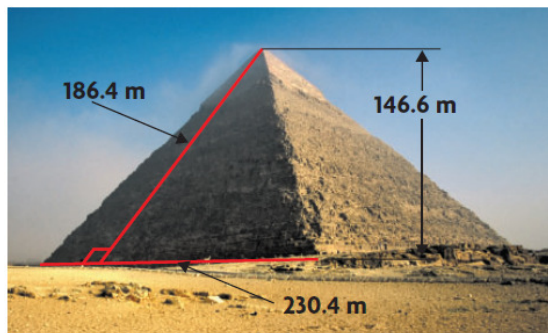


Formulas	
Object	Surface Area and Volume
rectangular prism 	$SA = 2(lw + lh + wh)$ $V = lwh$
right triangular prism 	$SA = bh + l(a + b + c)$ $V = \frac{1}{2}bhl$
right cylinder 	$SA = 2\pi r^2 + 2\pi rh$ $V = \pi r^2 h$
right pyramid 	$SA = l^2 + 2ls$ $V = \frac{1}{3}l^2h$
right cone 	$SA = \pi r^2 + \pi rs$ $V = \frac{1}{3}\pi r^2 h$
sphere 	$SA = 4\pi r^2$ $V = \frac{4}{3}\pi r^3$

The Great Pyramid of Giza in Egypt was built on a square base, with the dimensions shown.

An artist who works with plate glass wants to build a replica of the pyramid for an installation at an art gallery. The artist is restricted by the floor dimensions, which are 6.0 m by 6.0 m, and the ceiling height of 3.5 m. As well, the glass sculpture must have room for a 1.0 m walkway around its base.

- What scale factor might the artist use to build the sculpture?
- How much glass will the artist need to build the sculpture?



A 100g Toblerone bar has the following dimensions 1.375" x 8.25" x 1.25" (BxLxH). The largest Toblerone bar is 4.5kg! Find the volume of the 100g bar and surface area of its packaging. What is the volume and surface area of the largest Toblerone using a scale factor?

