Lesson 11: Volume with Fractional Edge Lengths and Unit Cubes

Problem Set

1. Answer the following questions using this rectangular prism:

$$4\frac{2}{3} in.$$

$$9 in.$$

$$1\frac{1}{3} in.$$

* 1. What is the volume of the prism?
	2. Linda fills the rectangular prism with cubes that have side lengths of $\frac{1}{3}in$. How many cubes does she need to fill the rectangular prism?
	3. How is the number of cubes related to the volume?
	4. Why is the number of cubes needed different from the volume?
	5. Should Linda try to fill this rectangular prism with cubes that are $\frac{1}{2} in.$ long on each side? Why or why not?
1. Calculate the volume of the following prisms.
	1.

$$24 cm$$

$$4\frac{1}{2} cm$$

$$2\frac{2}{3} cm$$

$$2\frac{3}{4}in.$$

$$3\frac{2}{5}in.$$

$$5\frac{1}{2} in.$$

1. A rectangular prism with a volume of $12 $cubic units is filled with cubes twice: once with cubes with $\frac{1}{2}$-unit side lengths and once with cubes with $\frac{1}{3}$-unit side lengths.
	1. How many more of the cubes with $\frac{1}{3}$-unit side lengths than cubes with $\frac{1}{2}$-unit side lengths are needed to fill the prism?
	2. Finally, the prism is filled with cubes whose side lengths are $\frac{1}{4}$ unit. How many $\frac{1}{4}$-unit cubes would it take to fill the prism?
2. A toy company is packaging its toys to be shipped. Each toy is placed inside a cube-shaped box with side lengths of $3\frac{1}{2} in$. These smaller boxes are then packed into a larger box with dimensions of $14 in. × 7 in. × 3\frac{1}{2} in$.
	1. What is the greatest number of toy boxes that can be packed into the larger box for shipping?
	2. Use the number of toy boxes that can be shipped in the large box to determine the volume of the shipping box.
3. A rectangular prism has a volume of $34.224 $cubic meters. The height of the box is $3.1 $meters, and the length is $2.4 $meters.
	1. Write an equation that relates the volume to the length, width, and height. Let $w$ represent the width, in meters.
	2. Solve the equation.