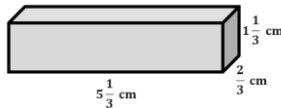


PROBLEM SET – Volume, Mr. Peralta, Class 622 and 623

Important Problems – Solve without a calculator. Express all answers as fractions in simplest form.

TASK 1: Consider the rectangular prism below



a) How many 1 cm cubes would fit in the figure?

b) How many $\frac{1}{3}$ cm cubes would fit in the figure?

Find the ratio between the number of $\frac{1}{3}$ cm cubes and the number of 1 cm cubes that would fit in the figure.

c) How many $\frac{2}{3}$ cm cubes would fit in the figure?

Find the ratio between the number of $\frac{2}{3}$ cm cubes and the number of 1 cm cubes that would fit in the figure.

Express as a fraction in simplest form.

d) How many $\frac{2}{9}$ cm cubes would fit in the figure?

Find the ratio between the number of $\frac{2}{9}$ cm cubes and the number of 1 cm cubes that would fit in the figure.

Express as a fraction in simplest form.

TASK 2: Suppose you have a box that has a length of 1,728 cm, a width of 864 cm, and a depth of 960 cm. (Use a calculator for this one)

a) How many 1 cm cubes would fit in the box?

b) How many 2 cm cubes would fit in the box?

Find the ratio between the number of 2 cm cubes and the number of 1 cm cubes that would fit in the figure

c) How many 4 cm cubes would fit in the box?

Find the ratio between the number of 4 cm cubes and the number of 1 cm cubes that would fit in the figure

d) How many 6 cm cubes would fit in the box?

Find the ratio between the number of 6 cm cubes and the number of 1 cm cubes that would fit in the figure

e) What would you predict would be the ratio between the number of x cm cubes and the number of 1 cm cubes that would fit in the figure? Explain your reasoning.

TASK 3:

A box contains 600 cubes, each with a length of $\frac{1}{2}$ cm. How many 1 cm cubes would fit in the same box? Show your work and explain your reasoning.

TASK 4: A rectangular prism with a volume of 8 cubic units is filled with cubes twice: once with cubes with side lengths of $\frac{1}{2}$ unit and once with cubes with side lengths of $\frac{1}{3}$ unit. 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? Show your work.

Challenge Problem

A *partition* of a counting number N is an expression that represents N as a sum of counting numbers. For example, there are eight partitions of 4 if order is considered important:

4	3 + 1	1 + 3	2 + 2
2 + 1 + 1	1 + 2 + 1	1 + 1 + 2	1 + 1 + 1 + 1

There are five unordered partitions of 4:

4	3 + 1	2 + 2	2 + 1 + 1	1 + 1 + 1 + 1 + 1
---	-------	-------	-----------	-------------------

a) How many ordered partitions are there of the numbers 1 through 6. Any patterns?

b) How many unordered partitions are there of the numbers 1 through 6. Any patterns? Will these partition numbers continue to be prime?