Name: _____ Period: _____

Classwork: Unit 5 Lesson 7

Lesson 7: The Root of the Problem

7.2: Thinking Inside the Box

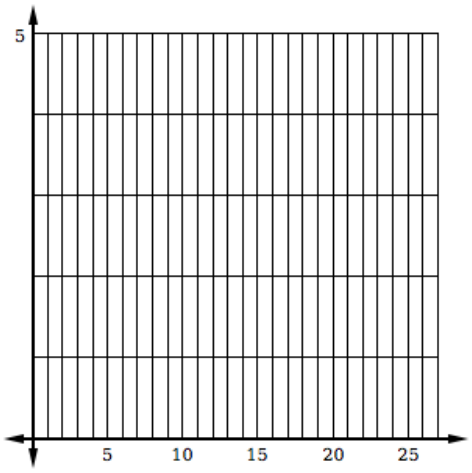
A shipping company makes cube-shaped boxes. Their basic box measures 1 foot per side. They want to know how to scale the basic box to build new boxes of various volumes.

volume in cubic feet	scale factor
0	
1	
5	
8	
10	
15	
20	
27	

1. If the company wants a box with a volume of 8 cubic feet, by what scale factor do they need to dilate the box?

2. If they want a box with a volume of 10 cubic feet, approximately what scale factor do they need?

3.



4. The company decides to create a graph to help analyze the relationship between volume (x) and scale factor (y). Complete the table, rounding values to the nearest hundredth if needed.

   Then, on the axes provided, plot the points and connect them with a smooth curve.

5. The graph shows the relationship between the volume of the dilated box and the scale factor. Write an equation that describes this relationship.

6. Suppose the company builds a box with volume 21 cubic feet, then decides to build another with volume 25 cubic feet. Use your graph to estimate how much the scale factor changes between these 2 dilated boxes.

7. Use your graph to estimate how the scale factor changes between a box with volume of 1 cubic foot and one with volume of 5 cubic feet.

7.3: Satellite Scale Factors

A government agency is redesigning a satellite, or an object that goes in orbit around Earth. The surface of the satellite is covered with solar panels that supply the satellite with energy. The interior of the satellite is filled with scientific instruments. In the current design, the satellite has a surface area of 5.4 square feet and a volume of 1.2 cubic feet.

1. If the agency wants to increase the surface area to 21.6 square feet so the satellite can generate more energy, by what scale factor do they need to dilate the satellite?

2. If the agency instead wants to increase the volume to 4.05 cubic feet to fit in more scientific instruments, by what scale factor do they need to dilate the satellite?