

## 6.G Banana Bread

### Task

Leo's recipe for banana bread won't fit in his favorite pan. The batter fills the 8.5 inch by 11 inch by 1.75 inch pan to the very top, but when it bakes it spills over the side. He has another pan that is 9 inches by 9 inches by 3 inches, and from past experience he thinks he needs about an inch between the top of the batter and the rim of the pan. Should he use this pan?

### IM Commentary

The purpose of this task is two-fold. One is to provide students with a multi-step problem involving volume. The other is to give them a chance to discuss the difference between exact calculations and their meaning in a context. It is important to note that students could argue that whether the new pan is appropriate depends in part on how accurate Leo's estimate for the needed height is.

### Solution

In order to find out how high the batter will be in the second pan, we must first find out the total volume of the batter that the recipe makes. We know that the recipe fills a pan that is 8.5 inch by 11 inch by 1.75 inches. We can calculate the volume of the batter multiplying the length, the width, and the height:

$$V = 8.5 \text{ in} \times 11 \text{ in} \times 1.75 \text{ in}$$

$$V = 163.625 \text{ in}^3$$

We know that the batter will have the same volume when we pour it into the new pan.

When the batter is poured into the new pan, we know that the volume will be  $9 \times 9 \times h$  where  $h$  is the height of the batter in the pan. We already know that  $V = 163.625 \text{ in}^3$ , so:

$$\begin{aligned}V &= l \times w \times h \\163.625 \text{ in}^3 &= 9 \text{ in} \times 9 \text{ in} \times h \\163.625 \text{ in}^3 &= 81 \text{ in}^2 \times h \\\frac{163.625 \text{ in}^3}{81 \text{ in}^2} &= h \\2.02 \text{ in} &\approx h\end{aligned}$$

Therefore, the batter will fill the second pan about 2 inches high. Since the pan is 3 inches high, there is nearly an inch between the top of the batter and the rim of the pan, so it will probably work for the banana bread (assuming that Leo is right that that an inch of space is enough).

