

A Treasure Hunt

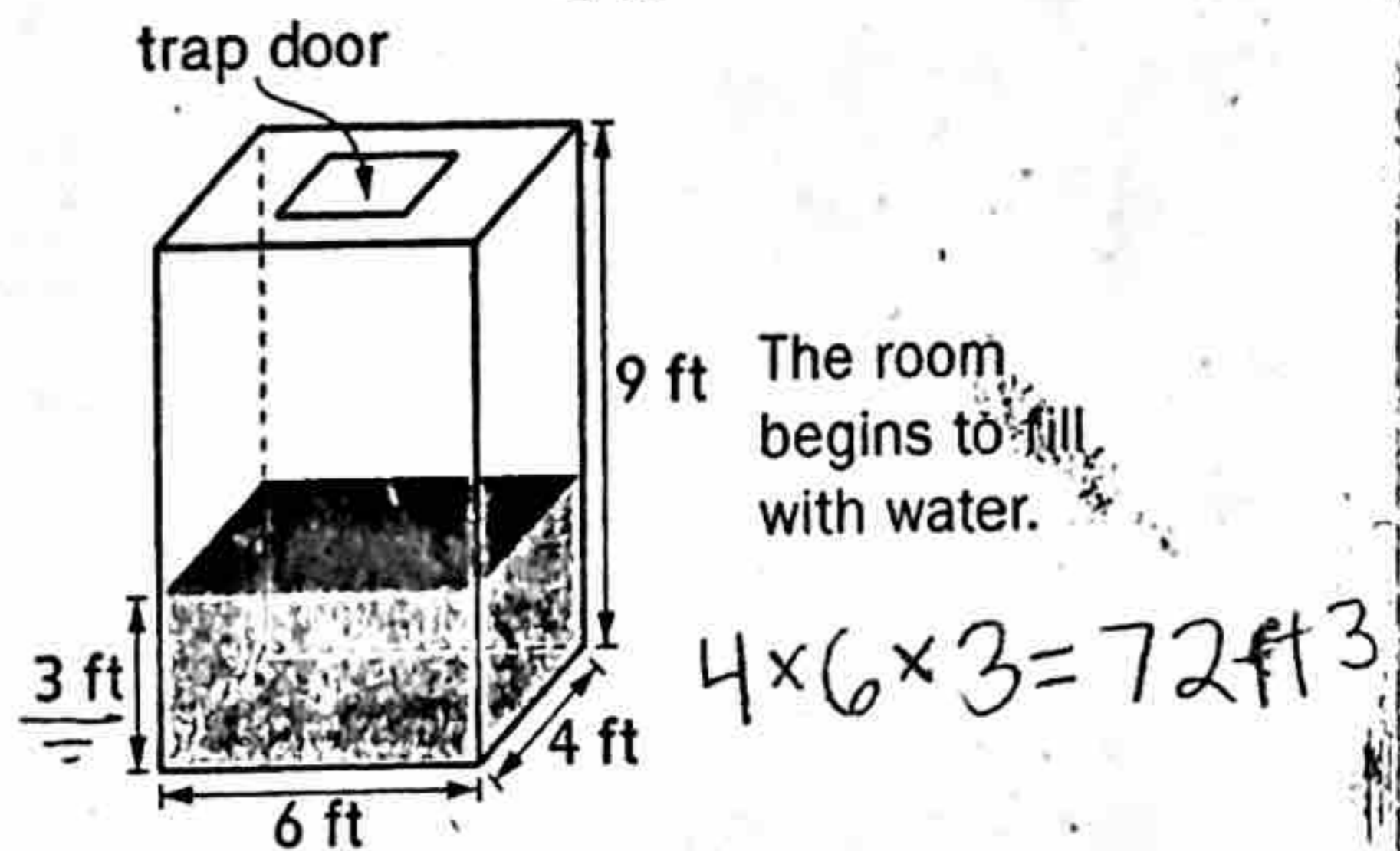
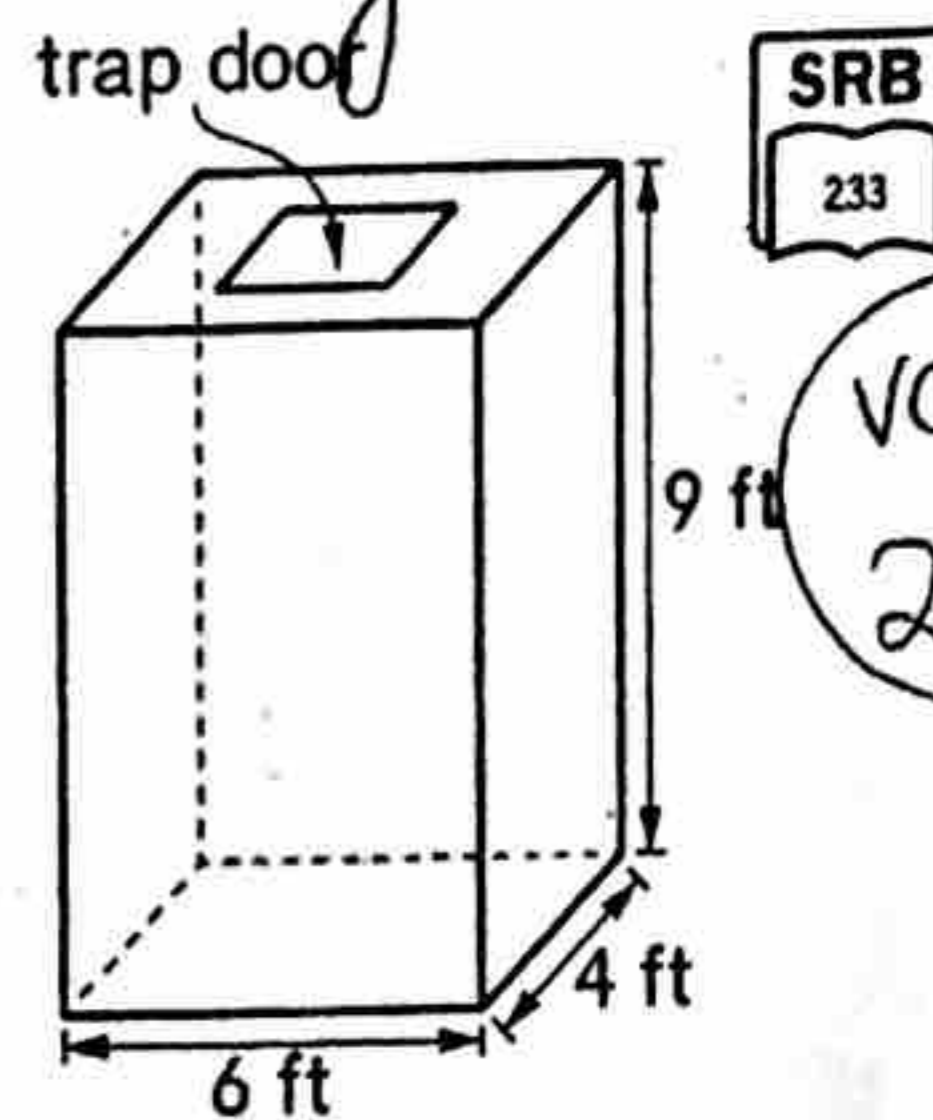
NAME Chloe DATE May 16th TIME

A fifth-grade class read an adventure story. In the story an explorer named Miriam traveled to South America in search of a lost treasure.

Traps had been set to guard the treasure. Miriam fell through a trap door into a 9-foot-high rectangular room that measured 4 feet wide by 6 feet long.

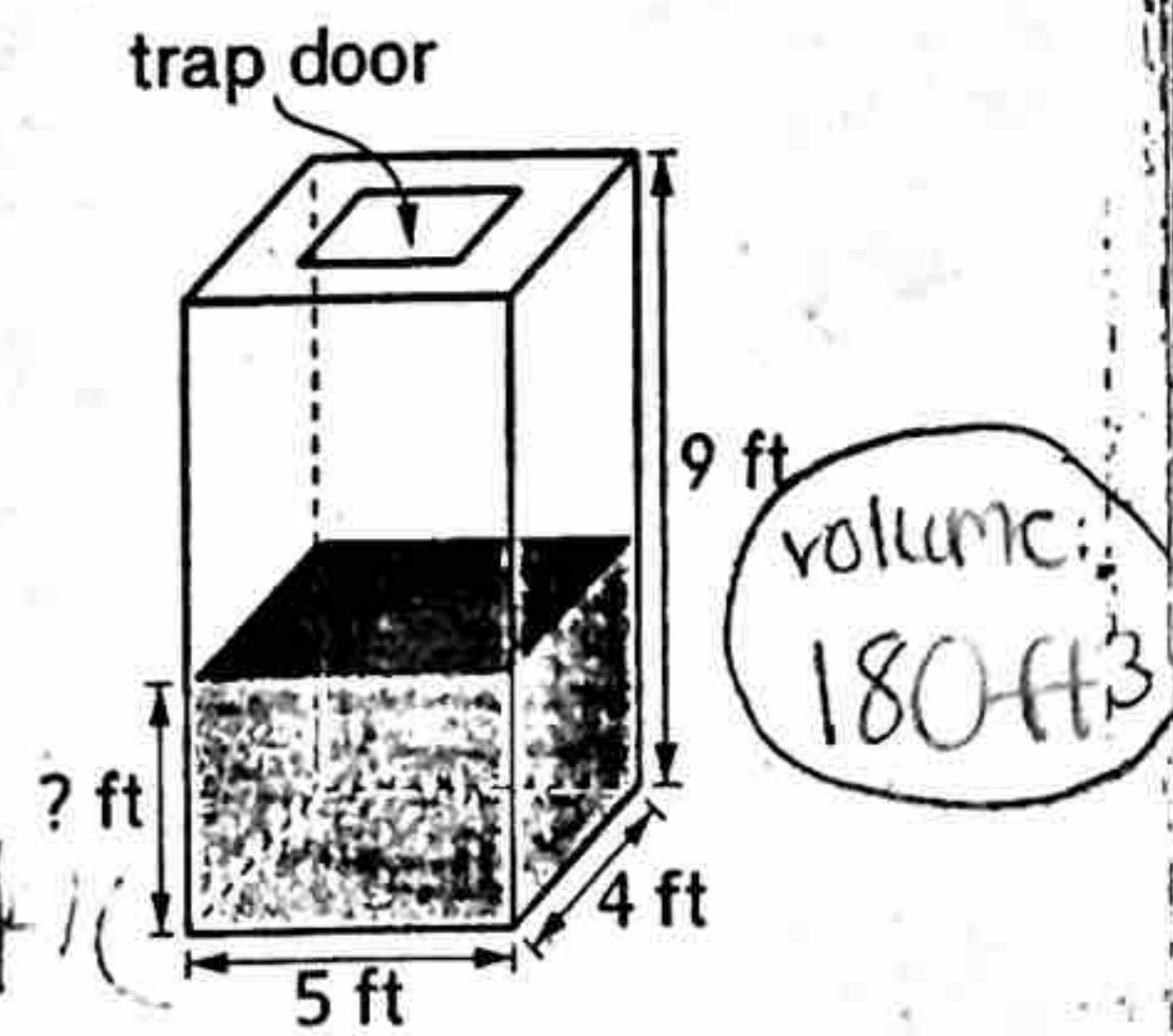
Suddenly, the room began to fill with water! It stopped when the water was 3 feet deep. Miriam sighed with relief, but her relief didn't last long.

The two 4-foot-wide walls of the room began to move, making the room smaller and causing the water level to rise. Every 10 minutes, the walls were 1 foot closer together.



- ① To the right is a picture of what the room looked like after 10 minutes, when the 4-foot-wide walls had moved 1 foot closer together.

What is the approximate height of the water?
Show how you found your answer.



The approximate height of the water would be $3\frac{3}{5}$ because if you multiply $3\frac{3}{5} \times 5 \times 4$ it would equal 72. That means that every 10 minutes, the water level would rise $\frac{3}{5}$ foot more. It would not rise 1 foot more because if you multiply that by 5 and 4, it would not equal the accurate number of 72 cubic feet of water.

A Treasure Hunt (continued)

NAME

Chloe

DATE

May 16th

TIME

- ② The only way to get out of the room is through the trap door in the ceiling. About how much time will pass before the water lifts Miriam to the trap door? Show your work. Explain how you used representations to help you solve the problem.

min	v	l	w	h
0	72	6ft	4ft	3ft
10	72	5ft	4ft	$3\frac{3}{5}$ ft
20	72	4ft	4ft	$4\frac{1}{2}$ ft
30	72	3ft	4ft	6ft
40	72	2ft	4ft	9ft

$$3 \times 4 = 12$$

$$12 \times 6 = 72$$

$$2 \times 4 = 8$$

$$8 \times 9 = 72$$

$$5 \times 4 \times 3\frac{3}{5} = 72$$

20

$$3 \left[\begin{array}{r} 60 \\ 12 \end{array} \right] = 72$$

I know that it will take 40 minutes until Miriam reaches the top of the room because $2 \times 4 \times 9 = 72$. These measurements are the exact volume of the room since 9 ft is

$$72 \div (2 \times 4) = 9 = \text{height of room}$$

the height. The reason the volume stays the same is because the amount of water isn't changing. It's really just the length of the room changing. I know these measurements are correct because if you multiply $6 \times 4 \times 3$, it will equal 72. That is the same conjecture for the rest of the numbers. The representation helped me understand what I needed to solve and why the amount of water didn't change. This is why it will take 40 minutes until Miriam reaches the very top of the trap door.