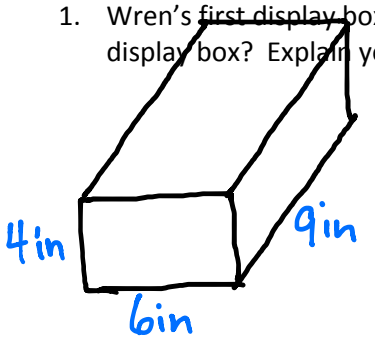
Name _____ Date _____

Wren makes some rectangular display boxes.

1. Wren's ~~first display~~ box is 6 inches long, 9 inches wide, and 4 inches high. What is the volume of the display box? Explain your work using a diagram.

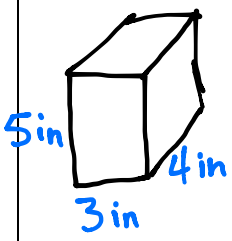


$V = l \times w \times h$
$= 6\text{in} \times 9\text{in} \times 4\text{in}$
$= 216\ \text{in}^3$

The box has a volume of $216\ \text{in}^3$.

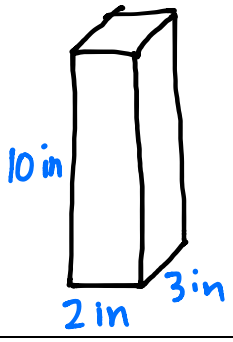
2. Wren wants to put some artwork into three large display boxes. She knows they all need a volume of 60 cubic inches, but she wants them all to be different. Show three different ways Wren can make these boxes by drawing diagrams and labeling the measurements.

Shadow Box A



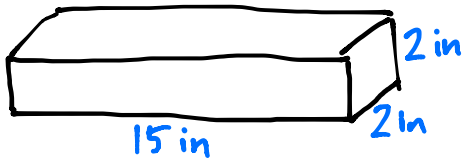
$V = l \times w \times h$
$= 3\text{in} \times 4\text{in} \times 5\text{in}$
$= 60\ \text{in}^3$

Shadow Box B



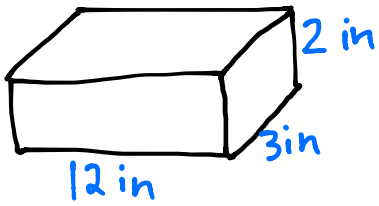
$V = l \times w \times h$
$= 2\text{in} \times 3\text{in} \times 10\text{in}$
$= 60\ \text{in}^3$

Shadow Box C



$V = l \times w \times h$
$= 15\text{in} \times 2\text{in} \times 2\text{in}$
$= 60\ \text{in}^3$

3. Wren wants to build a box to organize her scrapbook supplies. She has a stencil set that is 12 inches wide that needs to lay flat in the bottom of the box. The supply box must also be no taller than 2 feet. Name one way she could build a toy box with a volume of 72 cubic inches.



$V = l \times w \times h$
$= 12 \text{ in} \times 3 \text{ in} \times 2 \text{ in}$
$= 72 \text{ in}^3$

The box is 12 inches long, 3 inches wide, and 2 inches high.

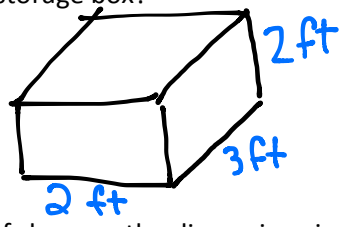
4. After all of this organizing, Wren decides she also needs more storage for her soccer equipment. Her current storage box measures 1 foot long by 2 feet wide by 2 feet high. She realizes she needs to replace it with a box with 12 cubic feet of storage, so she doubles the width.

a. Will she achieve her goal if she does this? Why or why not?

$1 \text{ ft} \times \cancel{2}\ 4 \text{ ft} \times 2 \text{ ft} = 8 \text{ ft}^3$

Wren does not reach her goal.

b. If she wants to keep the height the same, what could the other dimensions be for a 12-cubic-foot storage box?



$V = l \times w \times h$
$= 2 \text{ ft} \times 3 \text{ ft} \times 2 \text{ ft}$
$= 12 \text{ ft}^3$

length = 2 feet
width = 3 feet
height = 2 feet

c. If she uses the dimensions in Part (b), what is the area of the new storage box's floor?

The area of the box's floor is 6 ft^2 ($2 \text{ ft} \times 3 \text{ ft}$).

d. How has the area of the bottom in her new storage box changed? Explain how you know.

The original area of the box floor in Part (a) was 2 ft^2 ($1 \text{ ft} \times 2 \text{ ft}$)
In Part (c) the area of the box floor is 6 ft^2 ($2 \text{ ft} \times 3 \text{ ft}$).