Name _____ Date _____

Volume of Rectangular Prisms: From Layers of Cubes to Formulas

Directions: Volume is the amount of space inside a solid. It is measured in cubic units. For a rectangular prism, volume = length × width × height, which is the same as the area of the base times the height.

1. A box is packed full of 1-centimeter cubes with no gaps. The bottom layer has 4 rows of 6 cubes. The box holds 3 layers in all, and every layer is the same. How many cubes are in the box?

_____ cubes

2. A rectangular prism is 8 inches long, 5 inches wide and 3 inches high. What is its volume?

_____ cubic inches

3. In the formula $V = b \times h$, the letter b stands for the area of the base and h stands for the height. A rectangular prism has a base with an area of 18 square feet. Its height is 6 feet. Find the volume of this prism.

_____ cubic feet

4. The edges of a rectangular prism measure 6 cm, 2 cm and 5 cm. Which expressions give its volume in cubic centimeters? Select the three that do.

☐ A. $(6 \times 2) + 5$ ☐ B. 12×5 ☐ C. $6 + 2 + 5$

☐ D. $(6 \times 2) \times 5$ ☐ E. $6 \times (2 \times 5)$

5. Two students find the volume of a box that is 7 inches long, 4 inches wide and 5 inches high.

• Talia multiplies 7×4 and says the volume is 28 cubic inches.
• Elias multiplies $7 \times 4 = 28$ and then 28×5. He says the volume is 140 cubic inches.

Who found the volume, and how do you know?

A. Talia, because volume is found by multiplying the length and the width.

B. Elias, because the bottom layer holds 28 one-inch cubes and the box has 5 layers like it.

C. Neither, because the three edge lengths should be added: $7 + 4 + 5 = 16$ cubic inches.

6. A storage bin shaped like a rectangular prism has a volume of 96 cubic feet. The bin is 8 feet long and 3 feet wide. How tall is the bin?

_____ feet

7. Box A is 10 cm long, 3 cm wide and 2 cm high. Box B is a cube with edges that are each 4 cm long. Which box has the greater volume?

A. Box A

B. They have the same volume.

C. Box B

8. A shed is made of two rectangular prisms that do not overlap. The main part is 5 meters long, 3 meters wide and 3 meters high. The side part is 2 meters long, 3 meters wide and 3 meters high. What is the volume of the whole shed?

_____ cubic meters

9. A raised garden bed is shaped like a rectangular prism. Its length is 11 feet and its width is 2 feet. Soil fills the bed to a depth of 2 feet. How many cubic feet of soil are in the bed?

_____ cubic feet

10. The cargo space of a moving truck is a rectangular prism 12 feet long, 6 feet wide and 7 feet high. Boxes already fill 300 cubic feet of it. How many cubic feet of space are left?

_____ cubic feet