Module 5 - Lesson 23:

Find the volumes of right rectangular prisms by multiplying the edge lengths.

CCSS Standard – 5.MD.C.5.a

FLUENCY (10-min) **Hidden Factors**

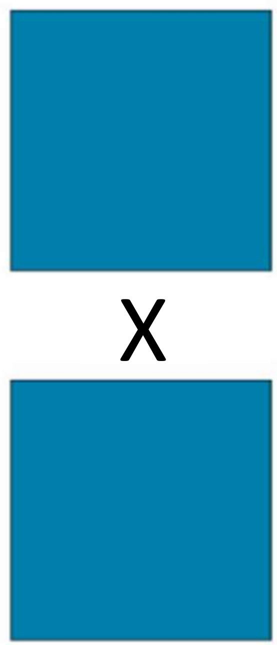
Determine the product then write and say a multiplication equation or related division equation.

0.1	0.2	0.3
0.4	0.5	0.6
0.7	0.8	0.9

Partners A and B: "Product is 0.15"

Partner A "0.5 x 0.3 = 0.15"

Partner B "0.15 ÷ 0.5 = 0.3"

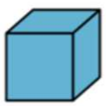


Task:

- Place deck of cards facedown.
- Flip over a card and place it on a blue square.
- Both partners say the product.
- Partner A records a MULTIPLICATION equation on their whiteboard.
- Partner B records a DIVISION equation.
- Finish when all cards have been used.

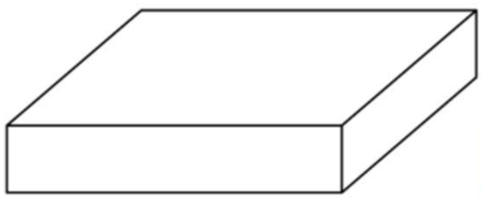
FLUENCY (10-min) **Counting with Centimeter Cubes**

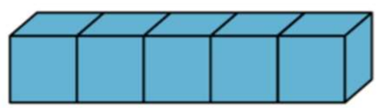
What is the volume of the layer of centimeters cubes next to the prism? Raise your hand when you know.

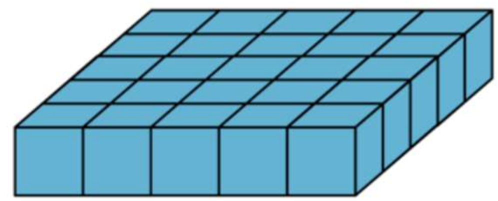


= 1 cubic centimeter

The 5 cubes represent one layer of the prism. How many layers will fit in the prism?







What is the volume of the prism?

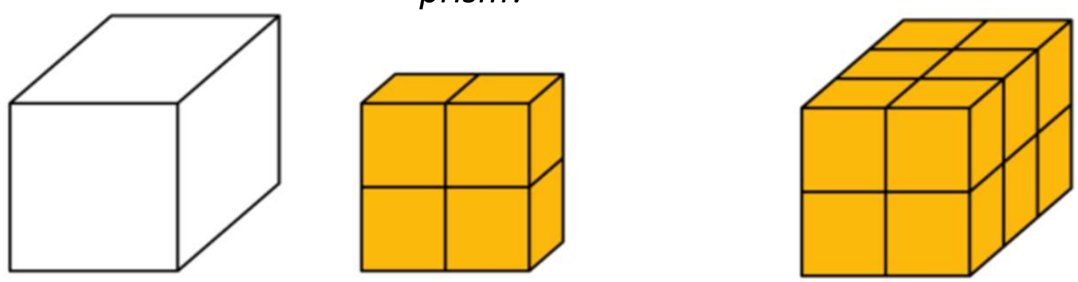
25 cubic centimeters

FLUENCY (10-min) **Counting with Centimeter Cubes**

What is the volume of the layer of centimeters cubes next to the prism?
Raise your hand when you know.

= 1 cubic centimeter

The 4 cubes represent one layer of the prism. How many layers will fit in the prism?

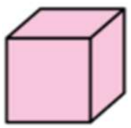


What is the volume of the prism?

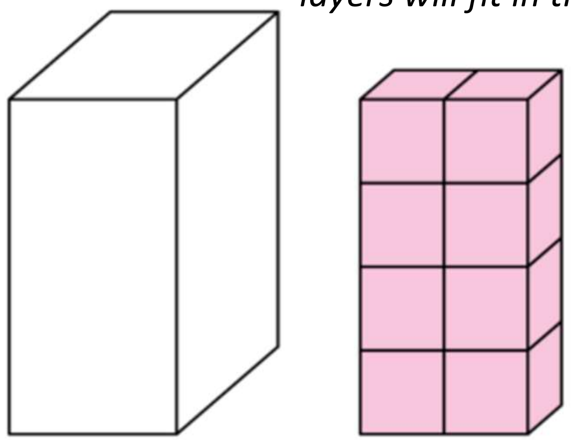
12 cubic centimeters

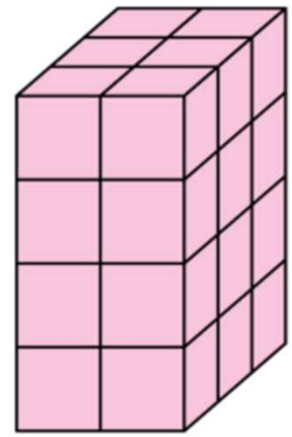
FLUENCY (10-min) **Counting with Centimeter Cubes**

What is the volume of the <u>layer</u> of centimeters cubes next to the prism?
Raise your hand when you know.

 = 1 cubic centimeter

The 8 cubes represent one layer of the prism. How many layers will fit in the prism?





What is the volume of the prism?

24 cubic centimeters

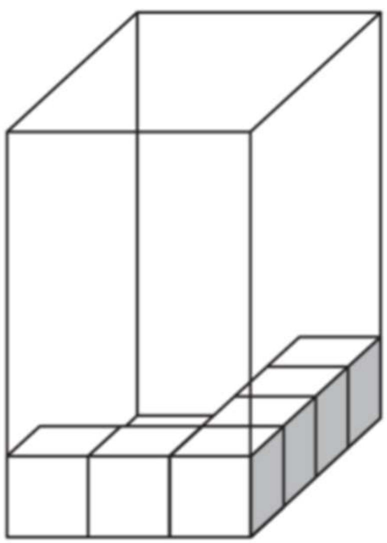
LAUNCH (5-min)

Determine whether there is enough information to find the volume of a right rectangular prism.

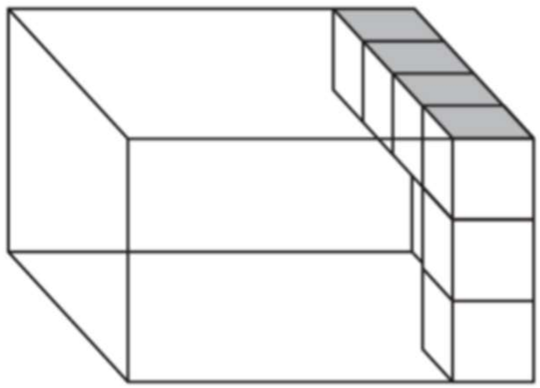
1-MIN. SILENT THINK TIME:

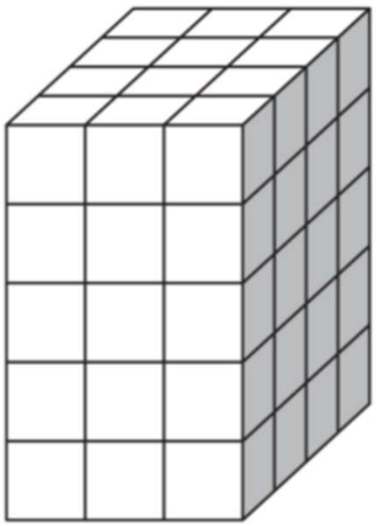
Do you have enough information to determine the volume of this right rectangular prism? Why?

Can we ESTIMATE the prism's volume or the number of layers?



If we turn the prism so it lays on a different face, would that change anything?





We have enough information to determine the **BASE of the prism**. 3 units by 4 units. **The BASE is 12 cubic units**.

No! We still do not have the height or third dimension of this prism. **We don't know how many layers there are.**

There are 5 layers!
V = B x H
V = 12 x 5 = 60 cubic units

LEARN (35-min)

Write Another Formula

We know that we can calculate the volume of a right rectangular prism by multiplying the area of it's BASE by its HEIGHT.

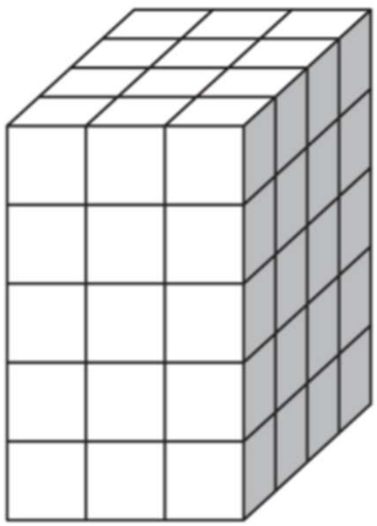
V = B x H

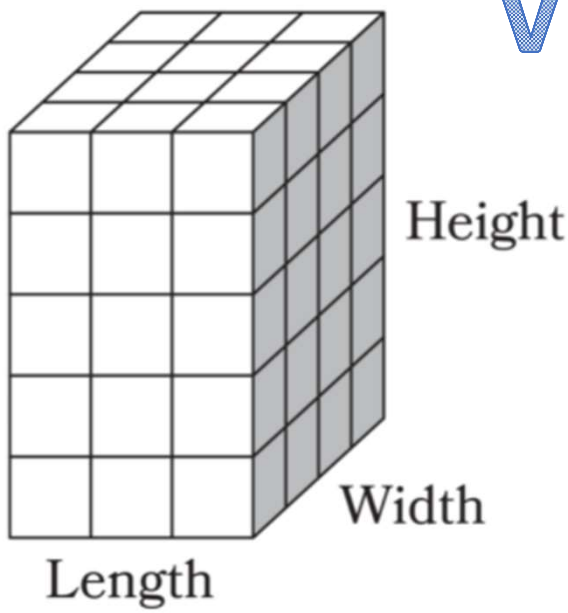
V = L x W x H

= 3 X 4 X 5

= 12 X 5

= **60 cubic units**



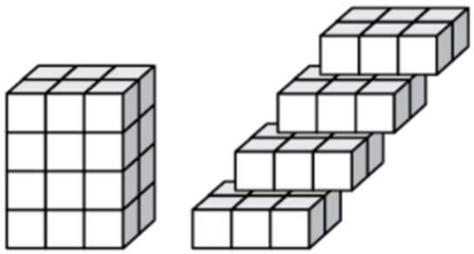
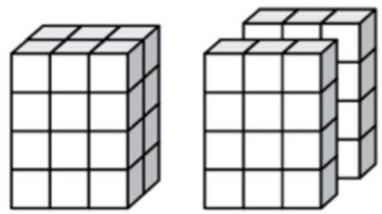
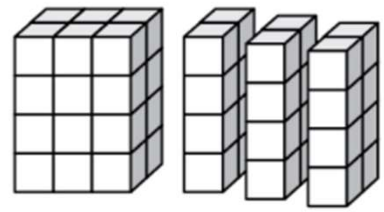


V = B x H
Base = L X W
Base = 3 x 4
V = 12 x 5
V = 60 cubic units

Another way that we can calculate the volume of a right rectangular prism is by using the formula: V = L x W x H.

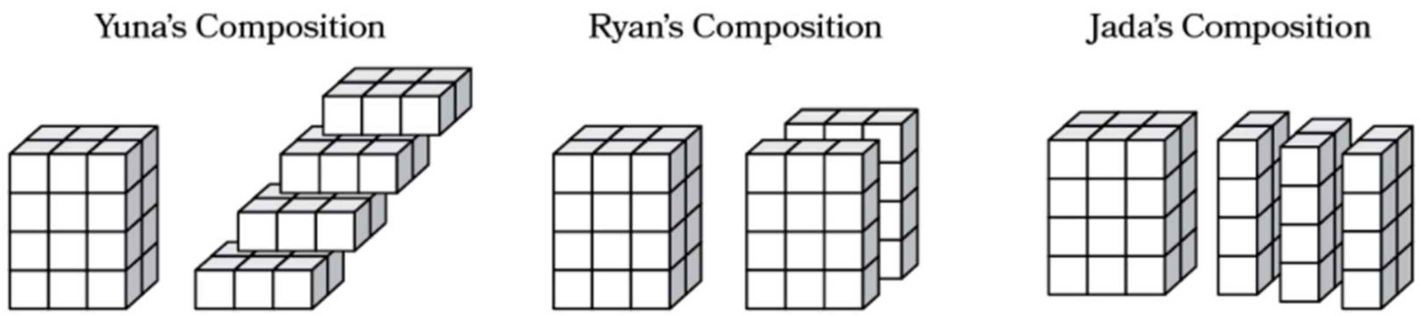
LEARN (35-min) **Write Another Formula**

Let’s connect the prisms that we used in a previous lesson using the new formula:

Yuna’s Composition	Ryan’s Composition	Jada’s Composition
		
$(2 \times 3) \times 4$	$(3 \times 4) \times 2$	$(2 \times 4) \times 3$
V = B x H 6 x 4 **24** cubic cm	V = B x H 12 x 2 **24** cubic cm	V = B x H 8 x 3 **24** cubic cm
V = L x W x H 2 x 3 x 4 **24** cubic cm	V = L x W x H 3 x 4 x 2 **24** cubic cm	V = L x W x H 2 x 4 x 3 **24** cubic cm

LEARN (35-min) **Write Another Formula**

Let's connect the prisms that we used in a previous lesion using the new formula:



$(2 \times 3) \times 4$ $(3 \times 4) \times 2$ $(2 \times 4) \times 3$

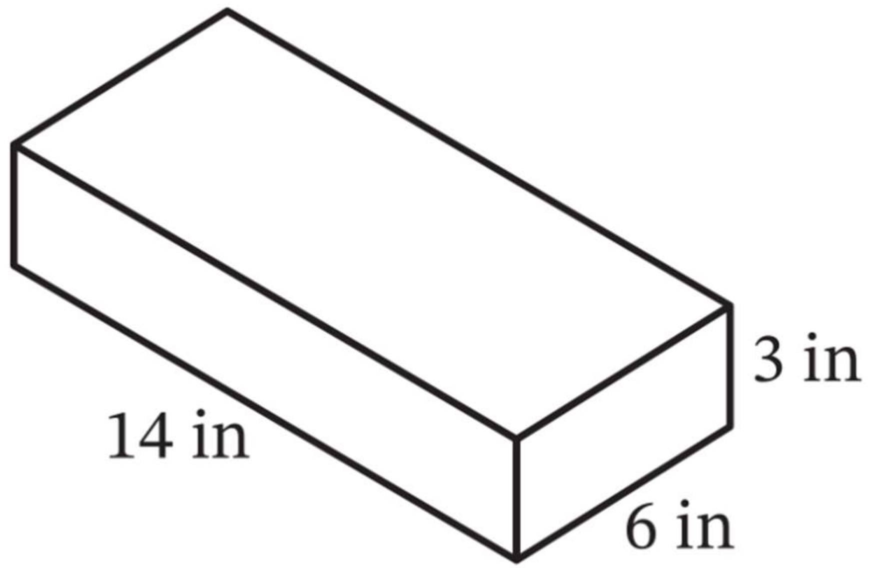
V = L x W x H 2 x 3 x 4 **24** cubic cm	V = L x W x H 3 x 4 x 2 **24** cubic cm	V = L x W x H 2 x 4 x 3 **24** cubic cm
Yuna's composition uses the **bottom face** as the base and **4 as the height**.	Ryan's composition uses the **front face** as the base and **2 as the height**.	Jada's composition uses the **right face** as the base and **3 as the height**.

The order in which we multiply does not change the volume (commutative property).

LEARN (35-min)

Use Edge Lengths to Find Volume

Why might using a formula be a good method for finding the volume of this right rectangular prism?



V = L x W x H

V = 14 x 6 x 3

V = 84 x 3

V = 252

cubic inches

We could have used any of these expressions to solve for this prism's volume:

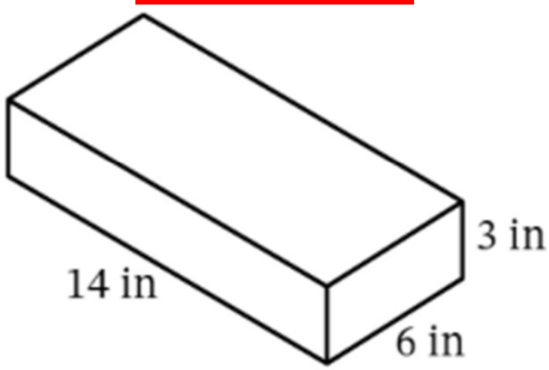
V = 14 x 6 x 3
V = (14 x 6) x 3
V = 14 x (6 x 3)
V = 6 x 3 x 14
V = 6 x 14 x 3

LEARN (35-min) **Use Edge Lengths to Find Volume**

LEARN book page 239.

1. Which right rectangular prism has the greater volume?

Prism *A*

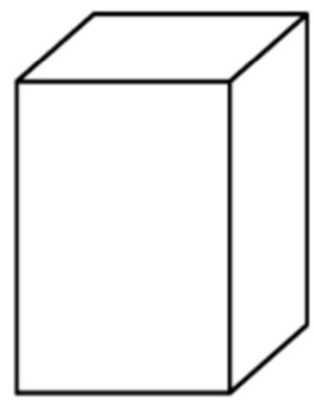


V = 252

cubic inches

Prism *B*

The area of the base is 20 square inches and the height is 12 inches.



V = B x H

V = 20 x 12

V = 240

cubic inches

LEARN (35-min)

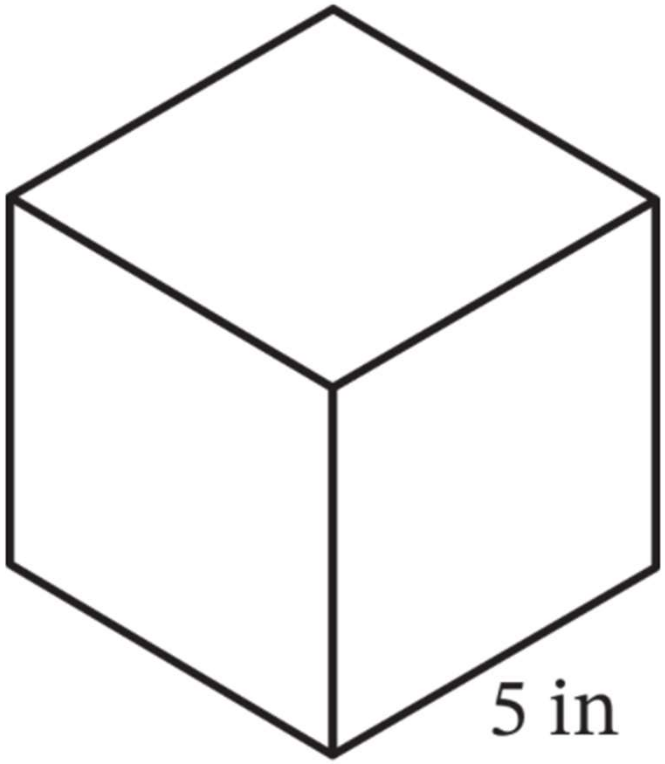
Use Edge Lengths to Find Volume

This right rectangular prism is a cube.
Do you think we can use the formula for a right rectangular prism to find the volume of this cube? Why?

Yes. A cube is a right rectangular prism!

How do you know which edge is the length, which edge is the width, and which edge is the height?

Since all edges are the same length, it doesn't matter which is which.



V = L x W x H
V = 5 x 5 x 5
V = 25 x 5
V = 125 cubic inches

LEARN (35-min)

Find an Unknown Edge Length

What information is given about this right rectangular prism?

The volume is 100 cubic feet.
One edge measures 4 feet.
Another edge measures 5 feet.

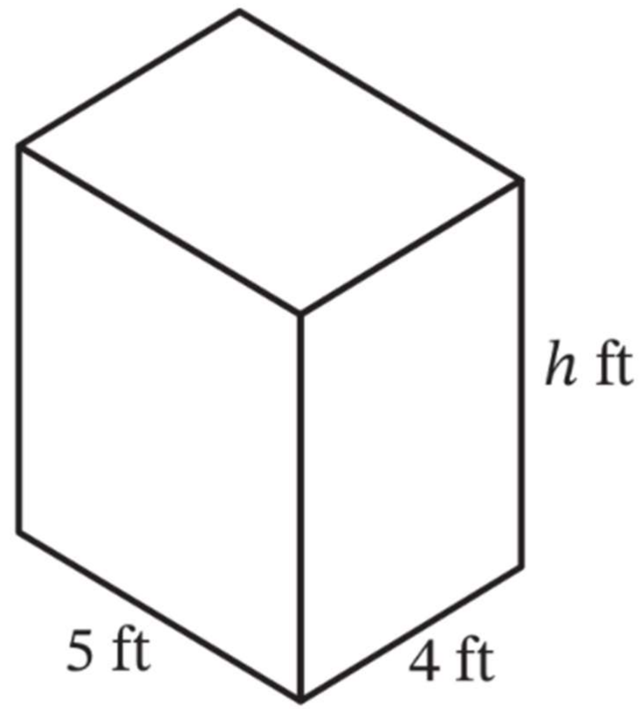
V = L x W x H

100 = 4 x 5 x **H**

100 = 20 x **H**

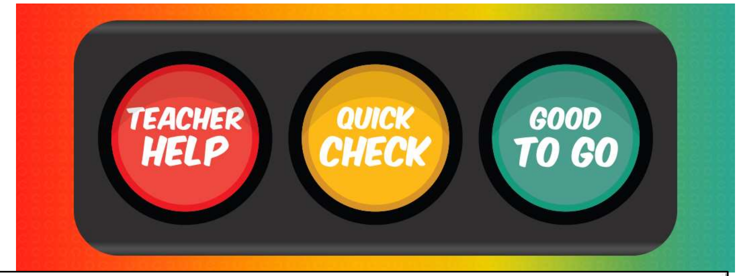
100 / 20 = **H**

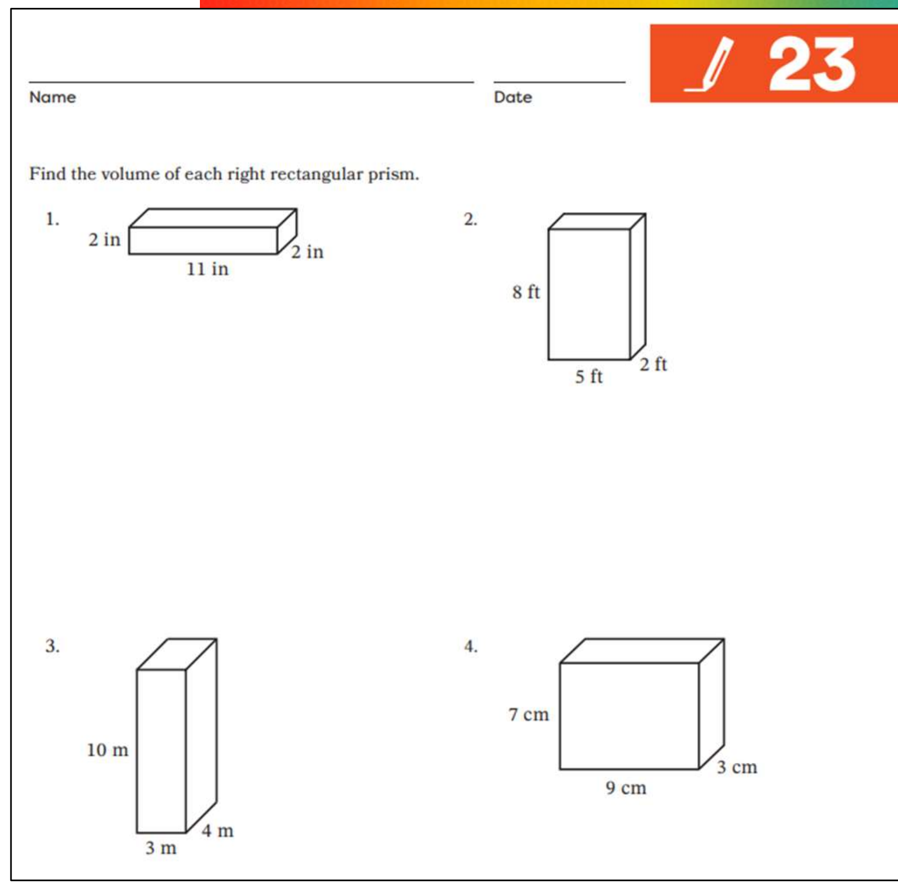
5 feet = **H**



The volume is 100 cubic feet.

LAND (10-min) **Exit Ticket**





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Name ______________________ Date __________

Find the volume of each right rectangular prism.

1. 2 in, 11 in, 2 in

2. 8 ft, 5 ft, 2 ft

3. 10 m, 3 m, 4 m

4. 7 cm, 9 cm, 3 cm

Exit Ticket – PAGE 245

Small Group Time:
Problem Set Pages 241 - 244

Homework:
Page 147 APPLY BOOK