Cannon Spidle   Mrs. S-smn

Question:

Michael says to find the volume of a rectangular prism you just count the cubes. Sam says you use the formula $l \times w \times h$ to find the volume. Who is correct? Explain your reasoning.

## 3-D figure in this situation:
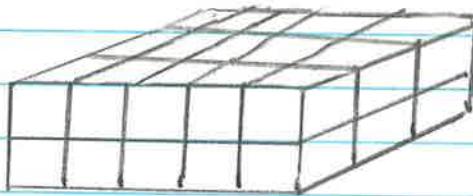
Claim:

To begin, in this situation there are two individuals who have different opinions on how to calculate the volume of a figure. However, both of them have correct opinions. First, to find volume, you can count all of the cubes. Second, you can also find volume using the more efficent way by using the formula. $(L \times W \times H)$.

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Data:

Michael's way:

(Counting the cubes.)

$$10 + 10 + 10 = 30 \, un^3$$
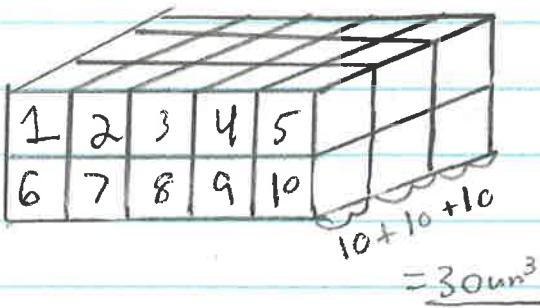
Michael got the answer of $30 \, un^3$.

Sam's Way:

(Using the formula.)

Height = 2un

Legnth = 5un

width = 3un

Length x Width x Height

$$5 \times 3 \times 2$$

$$5 \times 3 \times 2$$
$$15 \times 2$$
$$= \underline{30 \, un^3}$$
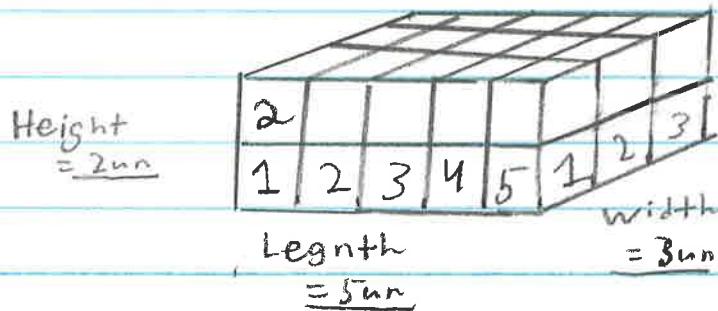
(Both answers for each option result with the answer of $\underline{30 un^3}$.)

Commentary:

So, to start off, what is volume? Well, first you have to know how to create a 3-D figure. In this case, the 3-D figure is a rectangular prism. Because of that, I will using a rectangular prism as an example for this commentary.

The numbers correspond to the number of the step → (1)

Anyways, lets get started.
First, the first thing you do is you create a 2-D rectangle. (I highly recommend using a ruler to create these lines.) Next, you

(2) then add a line in the middle of the rectangle.

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(3) After that, you calculate the distance of the two spaces next to the line. You then use that measurement to determine how much space you then put between the lines that go up. Now, you put an (4) indicator depending on how long the intervals are on the spaces going sideways. For example, imagine that the measurement of the spaces going sideways is $\frac{5}{16}$ of an inch. You would then use that measurement by putting $\frac{5}{16}$ inch between each space that goes up.

Moving on, after you put all of the indicators, (you might need to extend your rectangle if you run out of space for your indicators.), (5) you then need to draw straight lines that go up from those indicators.

You now need to add (6.) a line extending out of the right side of the shape.

(7) This line should be at about a 20° angle. (Use a protractor to help.) When you did that, you now need to add indicators with the same space between them as the last ones. ($\frac{5}{16}$ of an inch.)

(8) As of right now, you will not put a line where the new indicators are. Instead, you will jump over to the left side of the figure. You then need to add a line that is at about a 30° angle. (This line needs to extend out to the right.)

(9) Now you need to move back to the right of the figure. You now need to add a straight line that is vertical. This line should end up being at the same height as the line you just made.

(10.) When you completed those two steps you now need to connect those two lines.

(11) After you have done that, you now need to draw another diagonal line. This line, however, needs to be drawn from the top right of your original rectangle to the very top right corner of your figure.

(12) The indicators, now, should have a vertical line that goes up to the line you just made. When that is done,

(13) you now need to create a line that goes through the lines you just made. This line NEEDS to go straight through the middle of the other lines. (The angle of this horizontal line should be at about a 24° angle.)

(14) After that is done, the next thing you need to do is make a line that goes straight across from the end of the line you just made. This line should go from left to right.

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(You need to do this with every line from step 11.)
  To end, the last step involves you doing the same thing but with the lines from step 5. These lines should be at an angle of about 25°. When you are done with that you have completed your rectangular prism.

  The next thing to talk about is volume. So, what is volume? Volume is simply the amount of space an object takes up or occupies. Only one question remains. How do you find the volume of a 3-D figure?
  The first thing you need to do is you need to count how many cubes there are in the legnth, width, and height of the figure.

(17)

After that, you then need to multiply the length, width, and height. To do this, you can use the formula LxWxH. For example, lets say the legnth is 5, the width is 3, and the height is 2. You would multiply 5 and 3 (15), and then you would multiply 15 and 2 to get 30. (Since the cubes are classified as units, it would be 30 un³.)

There are two ways to calculate volume. (That was one way which is more efficient.) The second way involves you in counting the cubes. For example, imagine the top of a rectangular prism is 15un. (You figured this out by counting the cubes.) Adding on, lets say that the height is 2un. You would then multiply 15un and 2un to get 30un³.
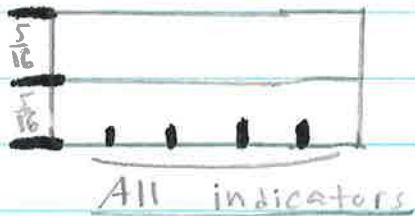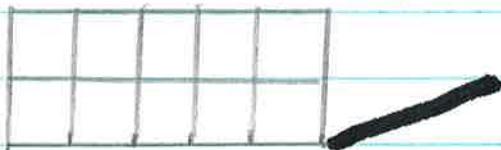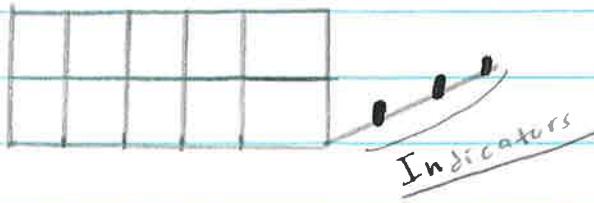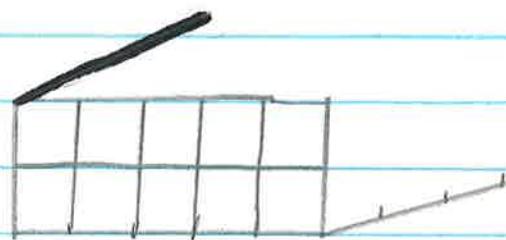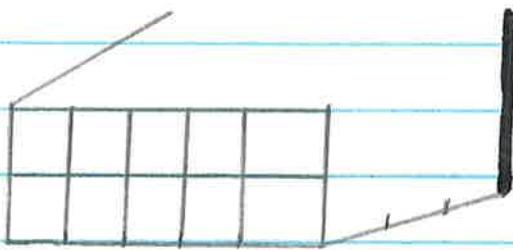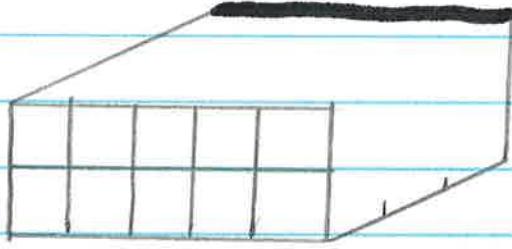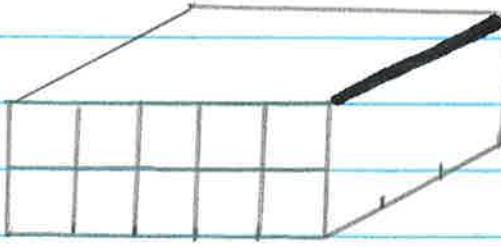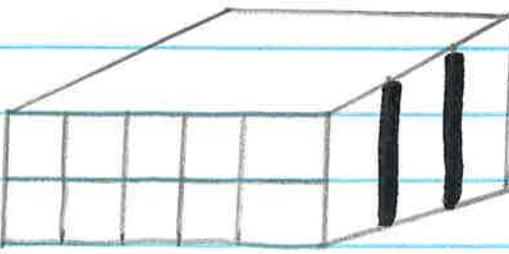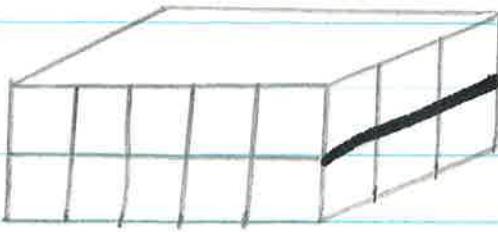
(18)

All Steps

(1.)

(2.)

(3-4)

$\frac{5}{16}$

$\frac{5}{16}$

All indicators

(5.)

(6.)

(7.)

Indicators

(8.)


(9.)

(10.)

(11.)

(12.)

(13.)

(14.)

(15.)

(16.)

Height = 2un

legnth = 5un

Width = 3un

(17.) $V = L \times W \times H$

$$\underline{5 \times 3 \times 2}$$
$$15 \times 2$$
$$= \underline{30 \, un^3}$$

(18.)

3×2

15×2
$$= \underline{30 \, un^3}$$
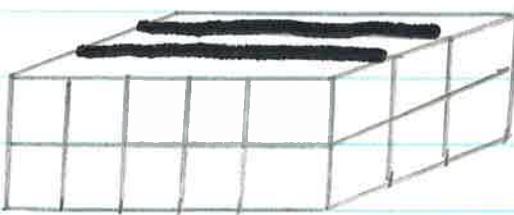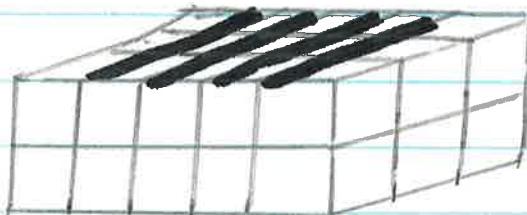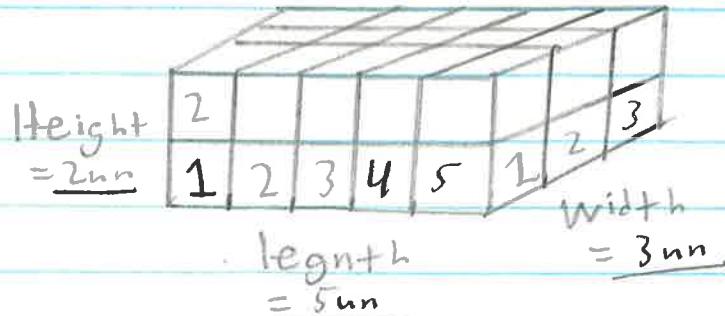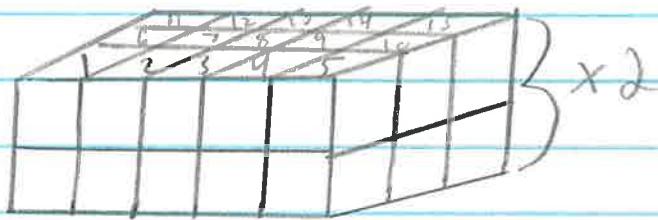
To sum it all up,   <u>Ending</u>
that is mainly how you
find volume and how you
make a rectangular prism.
I hope that you now
know that both Michael
and Sam are correct and
why.