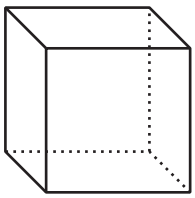
Decomposing Bases for Area

Let's look at how some people use volume.

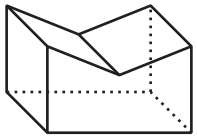
10.1 Are These Prisms?

1. Which of these solids are prisms? Explain how you know.

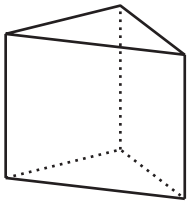
A



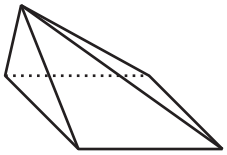
B



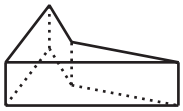
C



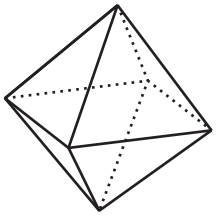
D



E



F

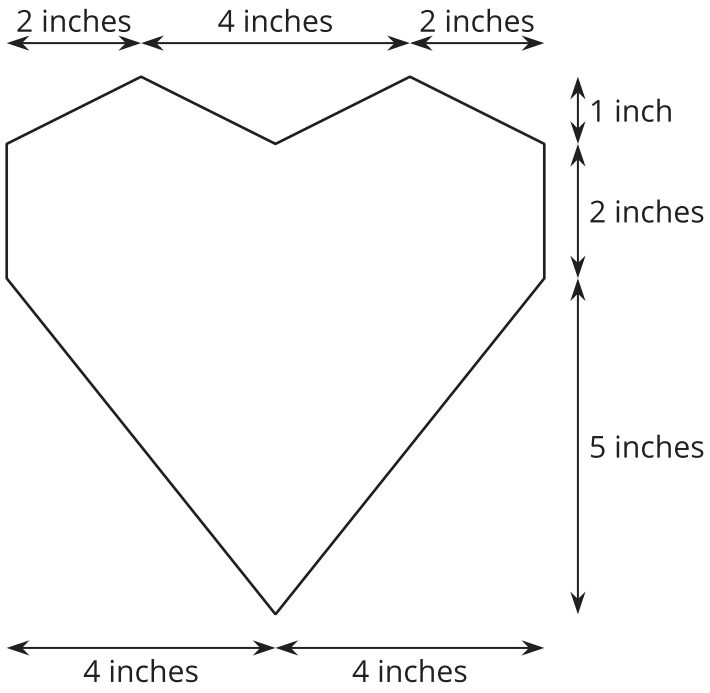


2. For each of the prisms, what does the base look like?
   a. Shade one base in the picture.
   b. Draw a cross-section of the prism parallel to the base.

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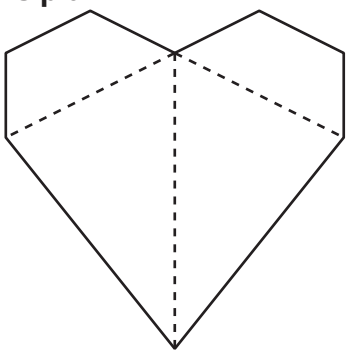
10.2 A Box of Chocolates

A box of chocolates is a prism with a base in the shape of a heart and a height of 2 inches. Here are the measurements of the base.

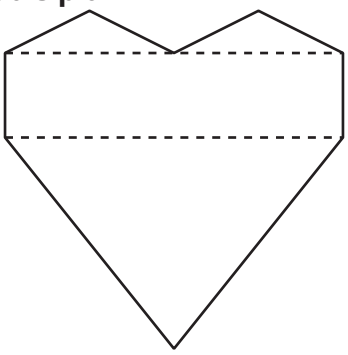


To calculate the volume of the box, three different students have each drawn line segments showing how they plan on finding the area of the heart-shaped base.

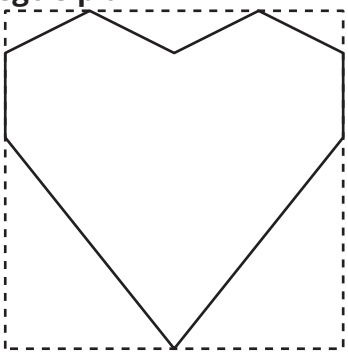
Lin's plan



Jada's plan



Diego's plan



1. For each student's plan, describe the shapes that the student must find the area of and the operations they must use to calculate the total area.

2. Although all three methods could work, one of them requires measurements that are not provided. Which one is it?

3. Between you and your partner, decide which of you will use which of the remaining two methods.
4. Using the quadrilaterals and triangles drawn in your selected plan, find the area of the base.

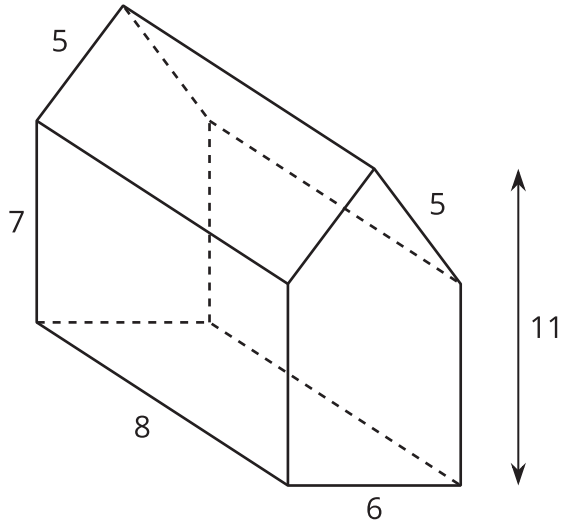
5. Trade with your partner, and check each other's work. If you disagree, work to reach an agreement.
6. Return your partner's work. Calculate the volume of the box of chocolates.

Are you ready for more?

The box has 30 pieces of chocolate in it, each with a volume of 1 in^3. If all the chocolates melt into a solid layer across the bottom of the box, what will be the height of the layer?

10.3 Another Prism

A house-shaped prism is created by attaching a triangular prism on top of a rectangular prism.



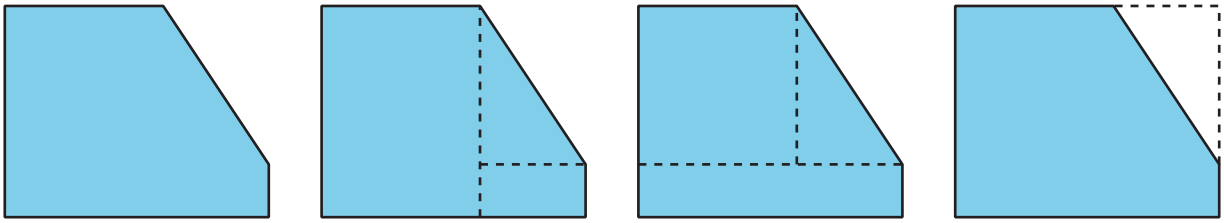
1. Draw the base of this prism and label its dimensions.

2. What is the area of the base? Explain or show your reasoning.

3. What is the volume of the prism?

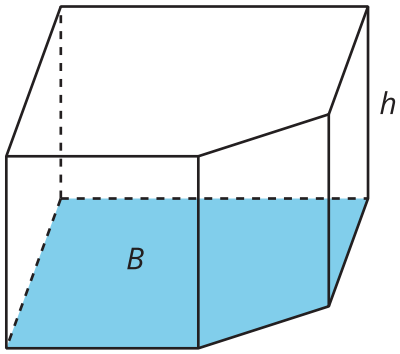
Lesson 10 Summary

To find the area of any polygon, you can decompose it into rectangles and triangles. There are always many ways to decompose a polygon.



Sometimes it is easier to enclose a polygon in a rectangle and subtract the area of the extra pieces.

To find the volume of a prism with a polygon for a base, you find the area of the base, B, and multiply that by the height, h.



$$V = Bh$$