



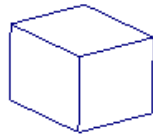
Sets of Nets

1. A rectangular prism is a solid object with 6 rectangular faces, much like a box.

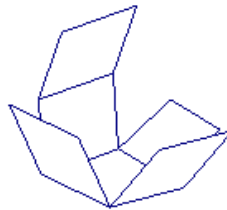


A rectangular prism.

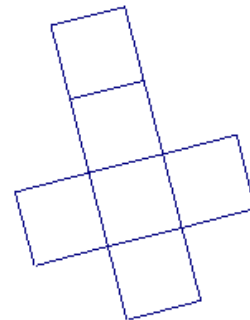
If we unfold a prism and flatten it out, the resulting figure is called a “net” of the prism.



Start with a rectangular prism,



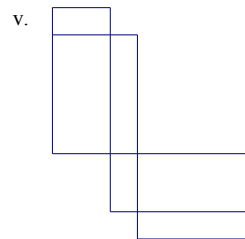
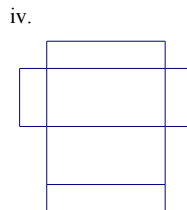
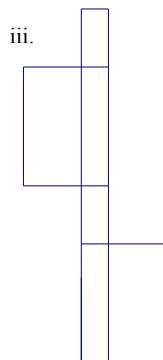
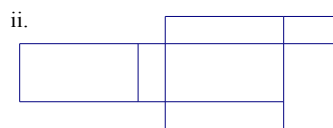
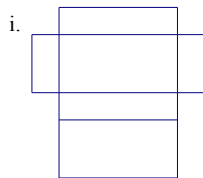
unfold it,



and flatten it out to form its net.

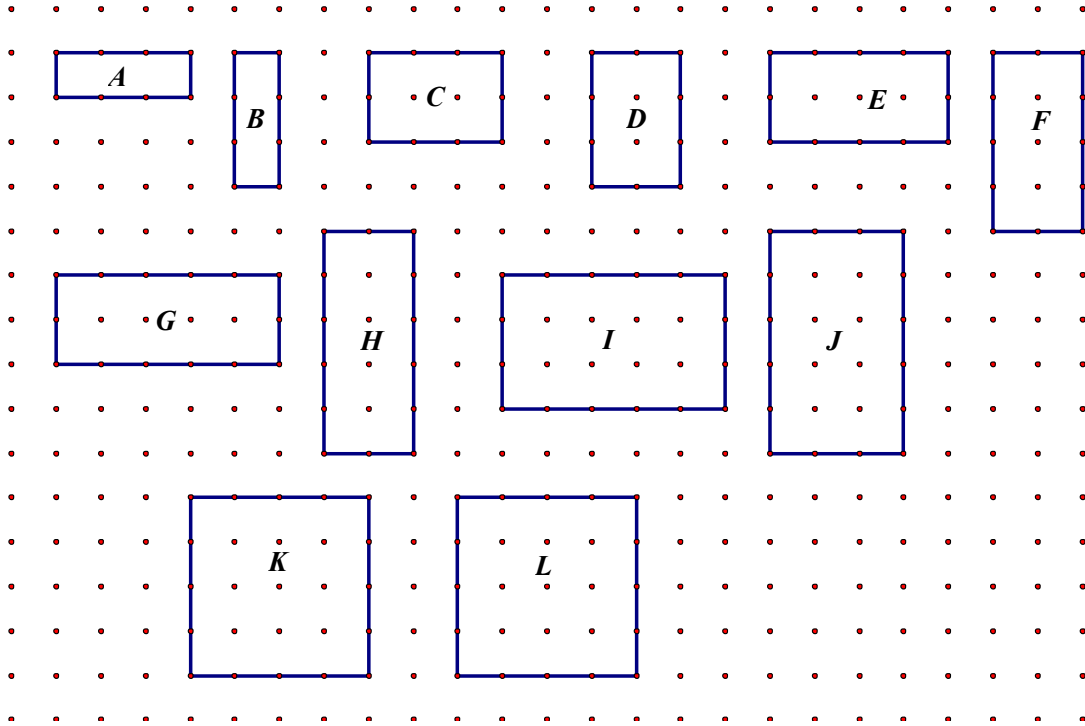
Many different nets can be formed from a given prism, depending on how you unfold it.

1. Only one of the following figures is NOT the net of a rectangular prism. Determine which one is not a net, and give a reason for your answer. For each of the others, indicate where you would fold first, fold second, and so on, in order to make the prism.





2. 12 rectangles are drawn on dot paper below, but only 6 of these rectangles can be placed together in order to form the net of a rectangular prism.
- a. Find these 6 rectangles.

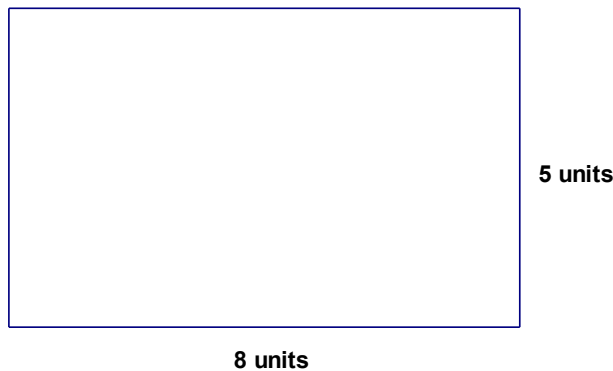




- b. On the dot paper below, show how the 6 rectangles from part a. can be arranged in order to form the net of a rectangular prism.



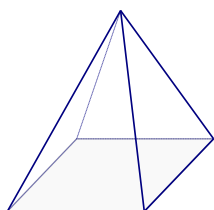
- c. Cindy must make a rectangular prism out of posterboard for a project in math class. She has a rectangular piece of posterboard measuring 8 units x 5 units, and she wants to use this as one of the faces of her prism. She will need to cut the other five faces from a large sheet of posterboard.



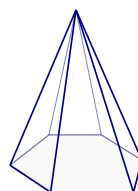
Cindy is your best friend and you want to help her do well on her project. What advice would you give her about the sizes of the five pieces of posterboard she needs to cut to make the other faces of the prism?

Extension Question:

A pyramid consists of a face that is a base and triangular faces that meet at a top vertex. Some sketches of pyramids are shown below:



A square-based pyramid.



A hexagonal pyramid.

Construct nets for each of the following pyramids:

- A pyramid whose base is an equilateral triangle.
- A pyramid whose base is not an equilateral triangle.
- A pyramid with a square base.
- A square-based pyramid constructed so that the four triangular faces are NOT all congruent to each other.
- Describe the strategy you used in designing these pyramids.

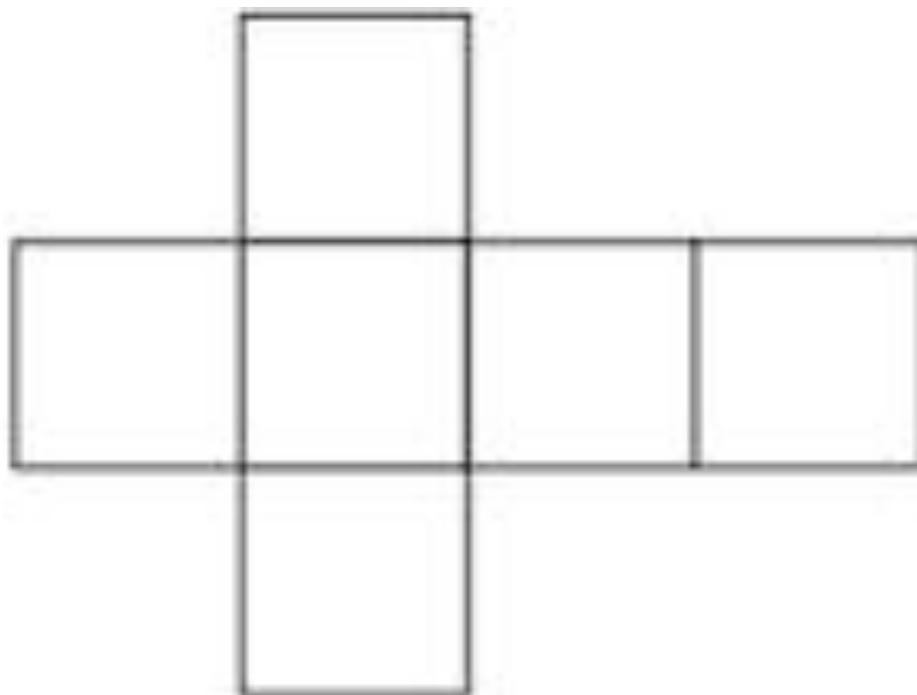
Warm-up for Sets of Nets

Step 1.

Using scissors, cut out the net below. Then, fold along the line segments between the faces of the net to construct a cube. You may use tape to help keep the cube shape together.

Step 2.

Properties of a Cube. Describe your cube in as many ways as possible.



Potential Sentence Starters and Frames

Some ideas for sentence frames/starters that could be incorporated into your lesson are listed below. If you think a sentence frame/starter will be helpful, consider how will it support students' mathematical learning and/or development of academic language, and decide which sentence frame/starter (from the list below or that you create) would best support students' learning.

Starters

A rectangular prism must have

The sides opposite one another in a rectangular prism are _____

In order to find the six rectangles in problem number 2, it's helpful to know _____

Frames

(Problem #1)

Figure number ___ is not the net of a rectangular prism because _____

Academic Language

Students should have opportunities to see, hear, and write key mathematical ideas during this activity. There are some specific terms that students need to understand in order to engage in this task, and there are some additional terms and phrases that may surface as the students engage with the task. You may think of additional words or phrases that are key to this activity. As the task is introduced, solved by the students, and discussed, ensure that students have opportunities to experience (i.e., through discussion, pictures, and the use of gestures) and to build understanding for key words and phrases. Examples of words and phrases that may be involved in work on this problem include:

- Prism;
- Pyramid; Rectangular Prism
- Equilateral Triangle; Rectangle
- Faces; Base
- Arrange; Organize



Word Chart for Sets of Nets

Spanish, French, Portuguese

* = Cognate

Words and Phrases	Academic Language Meaning	Everyday Language Version	Other Forms of the Word or Phrase	Related Words or Phrases	Translation	Examples of word use with students
Prism	A polyhedron made up of two parallel, congruent polygons (the bases) joined by parallelograms (the lateral faces).	---	Prisms	---	*Prisma *Prisme *Prisma	
Faces	The surfaces of a solid object.	The exterior surfaces of structures, objects.	Face Facing Faced	Façade Exterior	Caras *Faces *Faces	
Arrange	--	To place in a particular order.	Arranges Arranging Arranged	Organize Put in order	Ordenar *Ranger *Arranjar	



Words and Phrases	Academic Language Meaning	Everyday Language Version	Other Forms of the Word or Phrase	Related Words or Phrases	Translation	Examples of word use with students
Pyramid	A polyhedron that has a base and three or more triangular faces that meet at a point above the base.	---	Pyramids	---	*Pirâmide *Pyramide *Pirâmide	
Base	Side of a geometric figure to which an altitude can be drawn, constructed.	Bottom side or part of a structure.	Bases	Bottom Foundation Perpendicular to the altitude	*Base *Base *Base	
Equilateral Triangle	A triangle with all three sides of equal length and whose angles are all 60 degrees.	A triangle with all three sides of equal length.	---	---	*Triângulo equilátero *Triangle équilatérale *Triângulo equilátero	

I. “Nets”

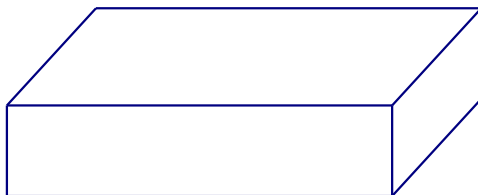
Your students will almost certainly be more familiar with a different type of “net” than the one referenced in the task. That is, they are likely more familiar with the mesh or web like fabric used for catching objects (e.g. basketball net, fishing net). Consider helping students distinguish between the definition of “nets” in a geometrical context and other types of “nets.” An explanation of a net in the context of the task could include the following language – *a net is a model or template for constructing a three-dimensional object.*

II. “Form” vs. “Construct”

The teacher may wish to consider using the word “form” instead of “construct” as it appears throughout the problem (e.g., *Construct* a **square** with exactly $\frac{1}{4}$ **the area** of the original square; *Construct* a **triangle** with exactly $\frac{1}{4}$ **the area** of the original square). As in English, the word construct (i.e., *construir, construire*) evokes notions of erecting physical structures. “Form,” on the other hand, may help more clearly convey to the student that s/he is to manipulate, change the appearance of the sheet of paper.

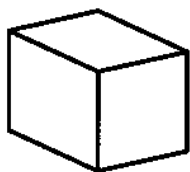
Grupos de Plantillas

Una prisma rectangular es un objeto solido que tiene seis caras rectangulares, como una caja.

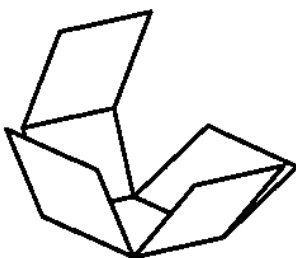


una prisma rectangular

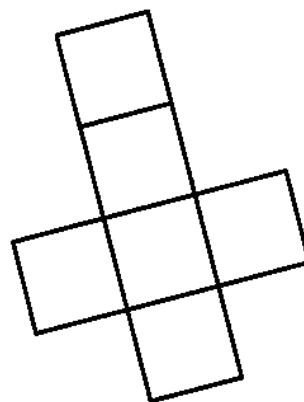
Si desdoblamos una prisma y la allanamos, la resultante figura es una “plantilla” de la prisma.



Comience con una prisma rectangular,



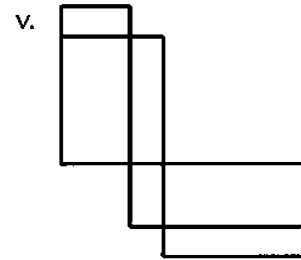
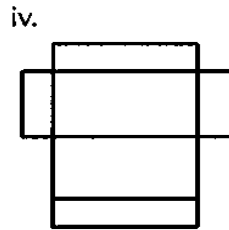
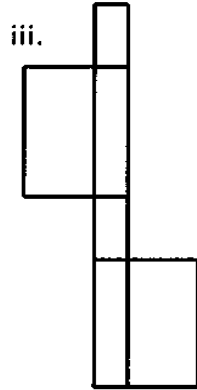
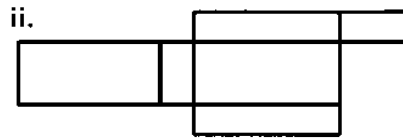
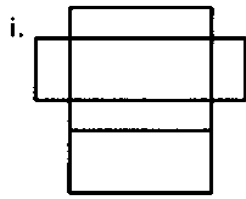
desdóblala,



y allánala para formar la plantilla.

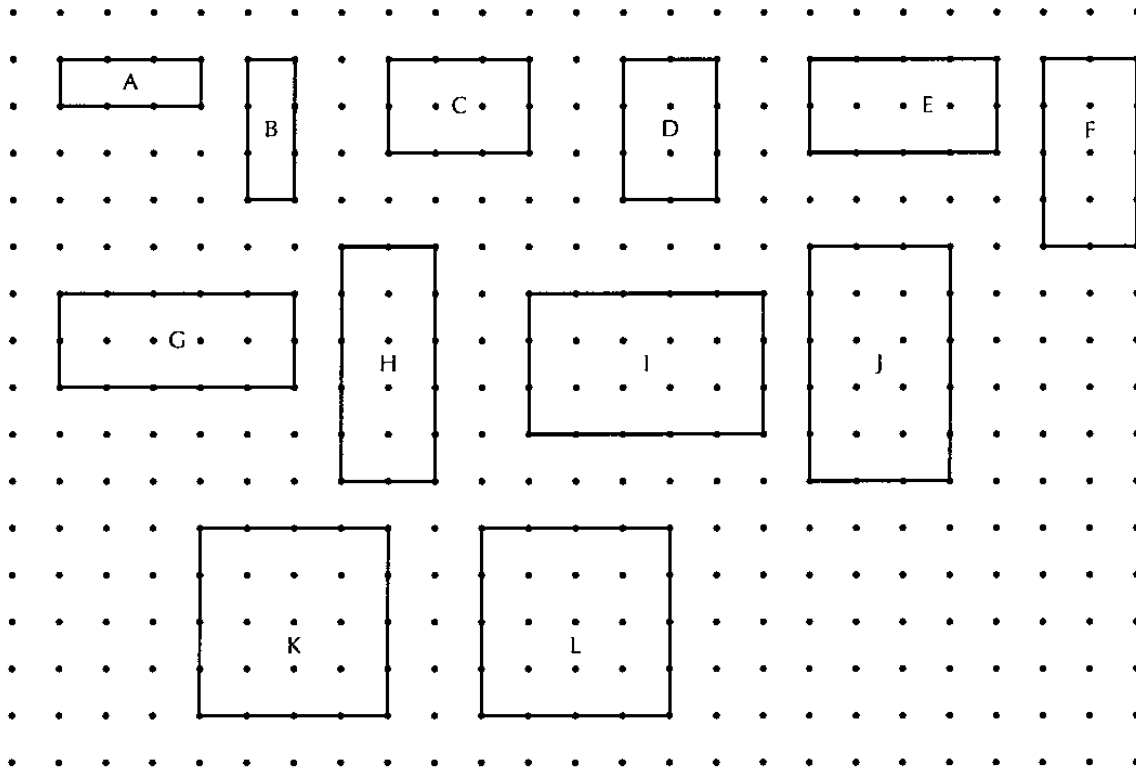
Se puede formar muchas plantillas diferentes de la misma prima, dependiendo de cómo la desdoblas.

1. Solo 1 de la figuras siguientes no es una plantilla de una prisma rectangular. Determine cual no es plantilla, y de una razón por su elección. Para cada de las otras, indique donde primero usted doblaría, donde usted en seguida doblaría, y demás, para crear la prisma.

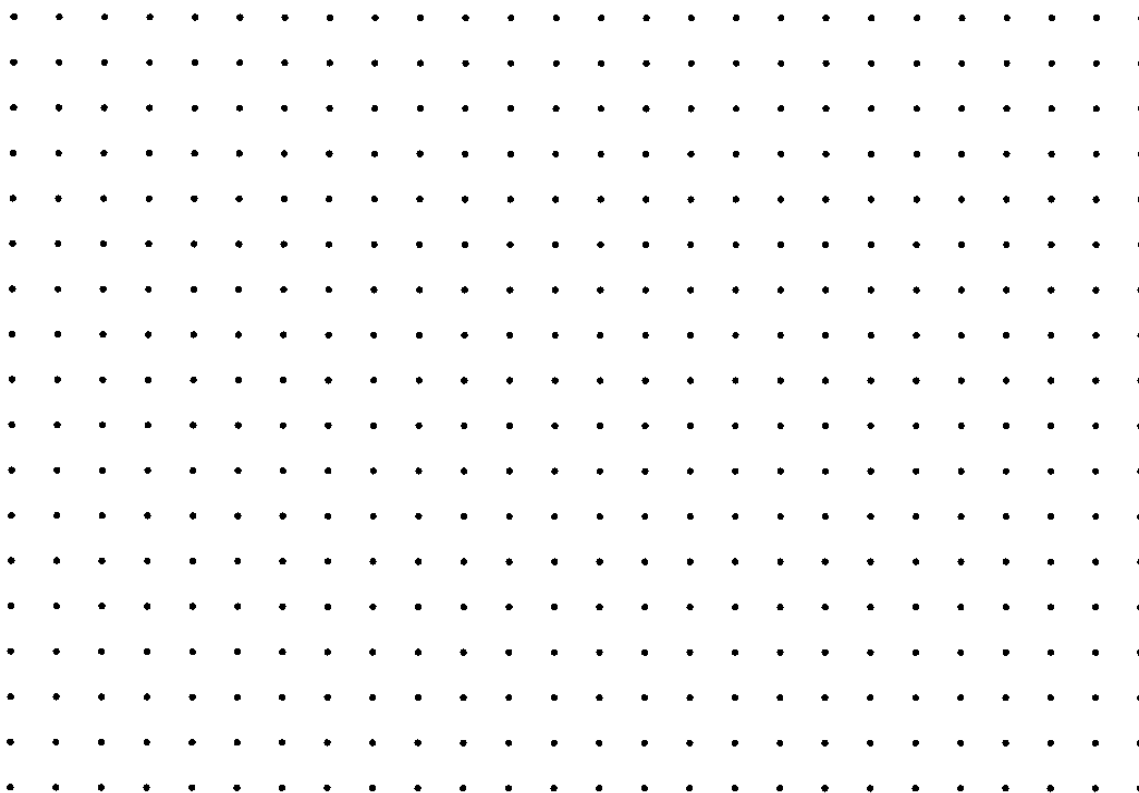


2. 12 rectángulos están dibujados sobre el papel de puntitos de abajo, pero solo seis de estos rectángulos pueden formar la plantilla de una prisma rectangular.

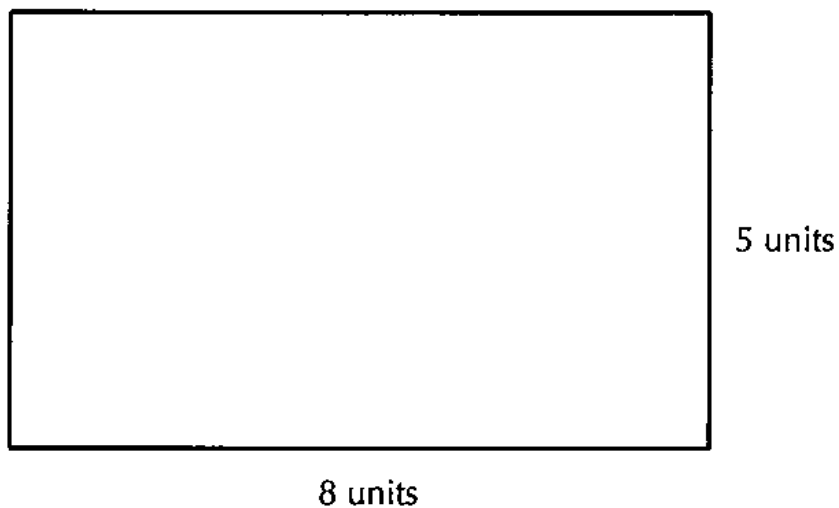
a. Encuentre estos 6 rectángulos.



- b. Sobre el papel de puntitos de abajo, demuestre como se puede ordenar los seis rectángulos de parte "a." para formar la plantilla de una prisma rectangular.



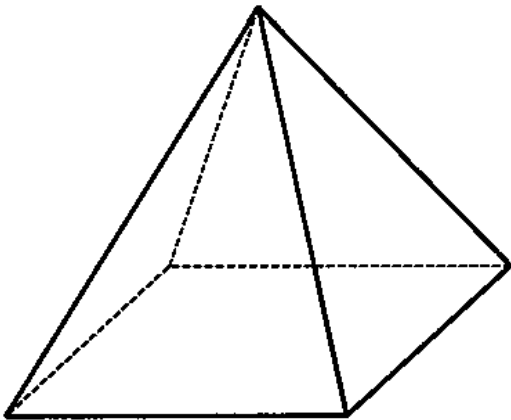
- c. Cindy necesita construir una prisma rectangular con cartulina para su clase de matemáticas. Ella tiene un pedazo rectangular de cartulina que mide 8 unidades por 5 unidades, y ella quiere usar este pedazo como una de las caras du su prisma. Ella necesitará cortar las otras 5 caras de un grande pedazo de cartulina.



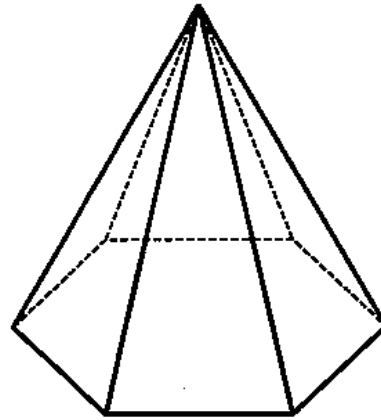
Cindy es su mejor amiga y usted quiere ayudarle a hacer un buen trabajo en su proyecto. ¿Qué consejo daría usted a ella sobre los tamaños de los cinco pedazos de cartulina que ella necesita cortar para crear las otras caras de la prisma?

Pregunta Suplementaria

Una pirámide tiene una cara que se llama el base y caras triangulares que se convergen sobre un punto llamado el vértice. Dos dibujos de pirámides están demostrados abajo



una pirámide con base cuadrado



una pirámide hexagonal

Construya plantillas para cada de las pirámides siguientes:

1. Una pirámide cuyo base es un triángulo equilátero.
2. Una pirámide cuyo base no es un sin triángulo equilátero.
3. Una pirámide cuyo base es cuadrada.
4. Una pirámide con base cuadrada cuyas caras triangulares no sean congruentes.
5. Describa la estrategia que usted usó en diseñar estas pirámides.