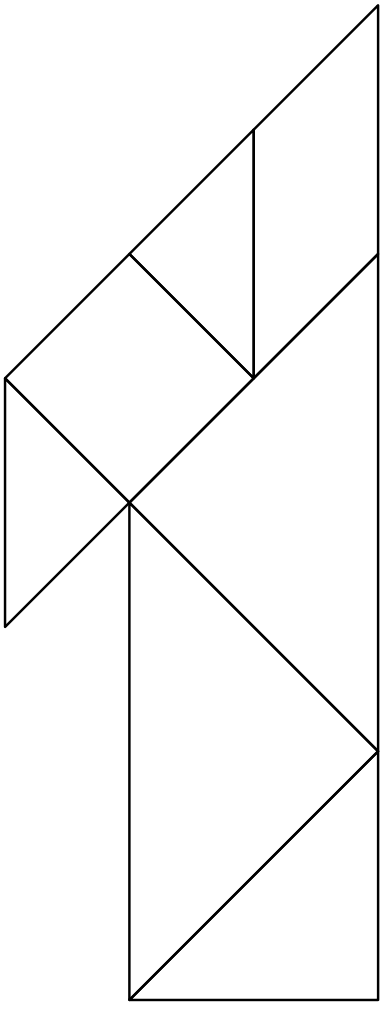
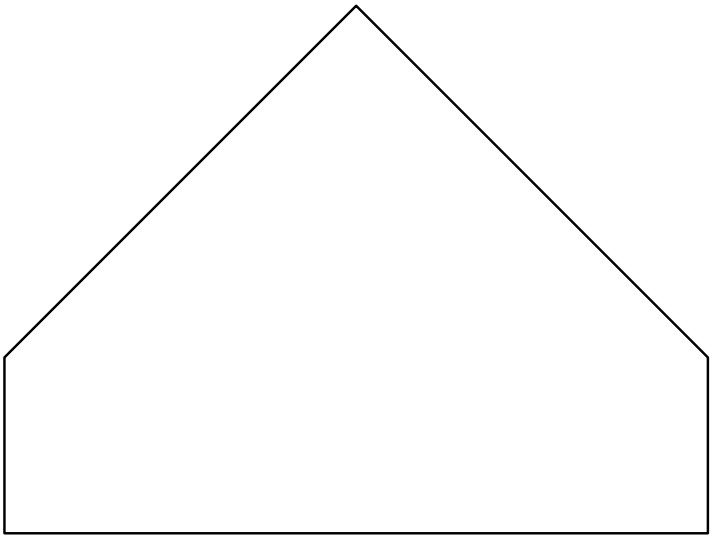
Chapter 1
Tangram Set Puzzles

For this chapter you need a single, complete set of the Tangram.



1.1. *The House*

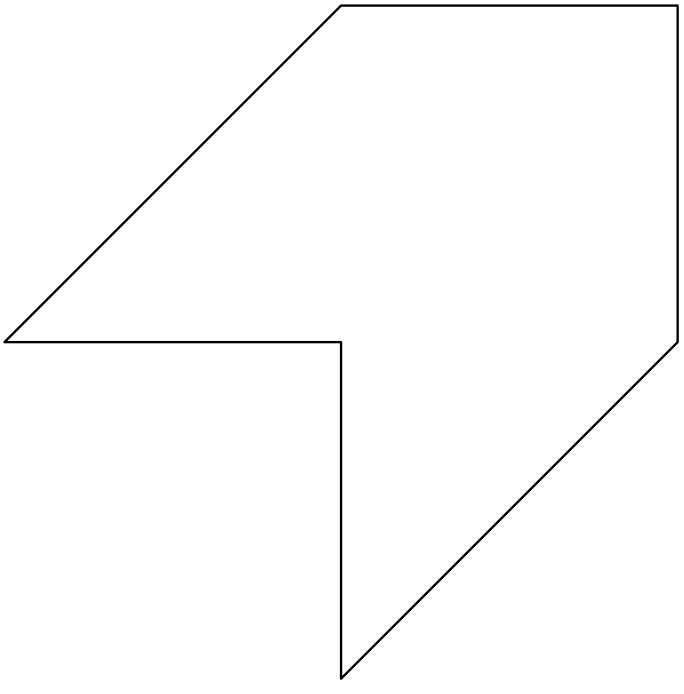


Arrange the seven pieces of the Tangram to make the shape above.

Find at least three different solutions:

(a) a solution where you can divide the shape into two parts having the same area by one straight cut along the lines of the pieces.
(b) a solution where, by "folding" the five small pieces onto the two big ones, the small pieces will cover the big ones, showing that their areas are equal.
(c) a solution where the two large triangles are not connected by their edges.

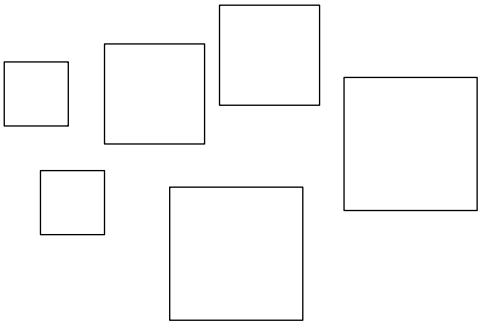
1.2. *The Rocket*



Step A: Create the shape above, using all the pieces of a Tangram set.
Step B: Divide this shape into four identical (in size and shape) parts, each part with a size of four units.

There are at least three solutions.

1.3. *Maximum Squares*

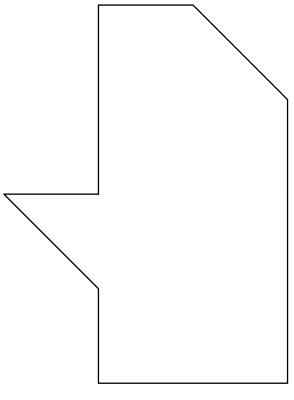


1? 2? 3? 4?

Make as many squares as you can using the seven pieces of a single Tangram set.

Use as many of the seven pieces as possible, but each piece can be used only once.

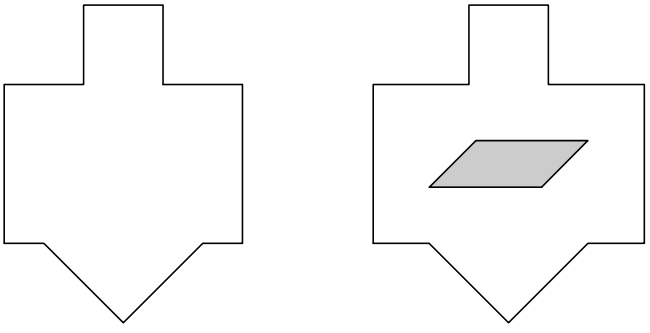
1.4. *The Hammer Head*



Step A: Create the shape above using all seven pieces of a Tangram set.
Step B: Divide this shape into four identical (in size and shape) parts, each part with the size of four units.

There are at least two solutions.

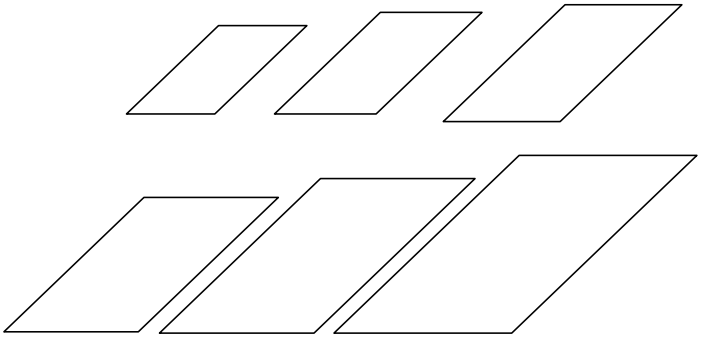
1.5. *The Spinning Top Paradox*



Both of these spinning tops are each made up of a single Tangram set. Recreate the two shapes.

Note: In this puzzle, the pieces need not align fully along their edges.

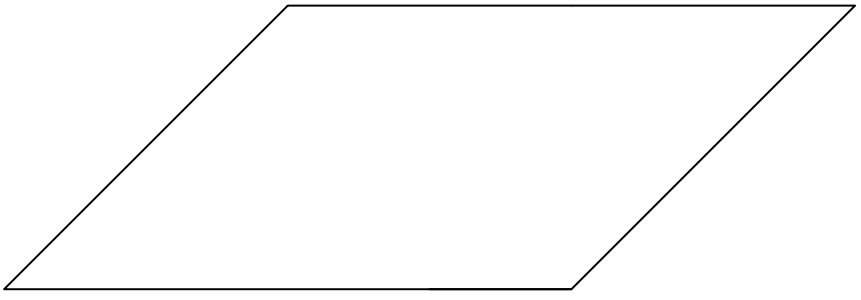
1.6. *Parallelograms*



Make six parallelograms using just two, then three, then four, then five, then six and finally all seven pieces of a full Tangram set.

Note: For this puzzle, all the parallelograms must have two 45° angles.

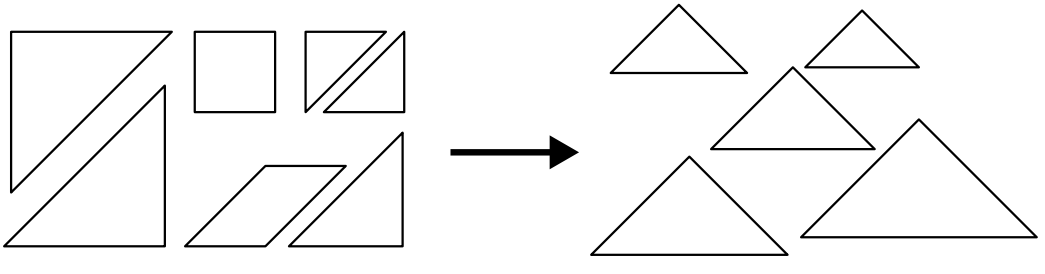
1.7. *The Wedge*



Step A: Create the shape above using all seven pieces of a Tangram set.
Step B: Divide this shape into four identical (in size and shape) parts, each part with the size of four units.

There are at least three solutions.

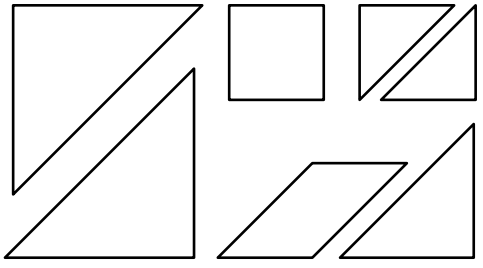
1.8. *Complete Triangles*



Make as many triangles as possible using the seven pieces of a single Tangram set.

You must use all seven pieces, but each piece can be used only once.

1.9. *The Mind Reader*

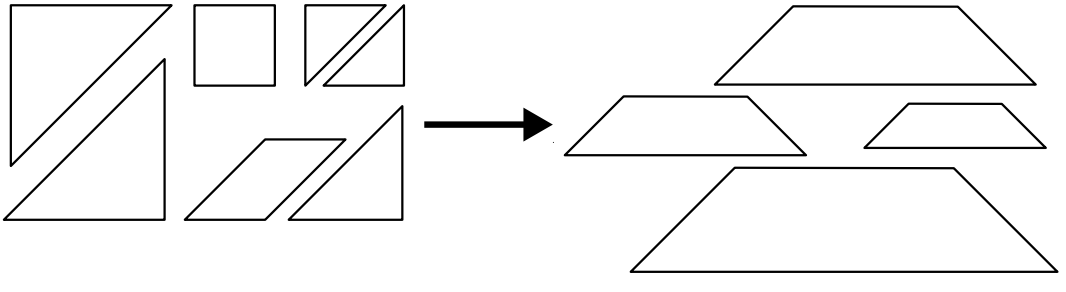


Take out any two-unit piece from a full Tangram set.

Divide the rest into two groups, with each group consisting of three pieces with a total of seven units.

Create the same symmetrical shape with each of the two groups of three pieces.

1.10. *Complete Trapeziums*

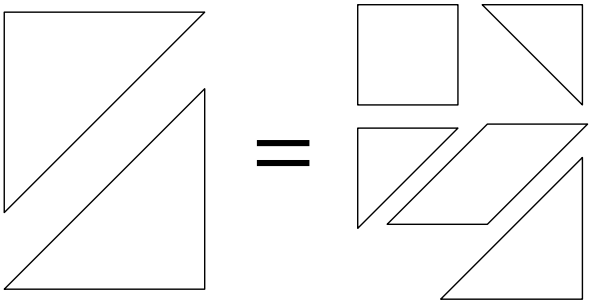


Make as many trapeziums as possible using all seven pieces of a single Tangram set.

Each piece can be used only once.

Note: For this puzzle, all trapeziums must have at least a single 45° angle.

1.11. *The Triangle Dues*



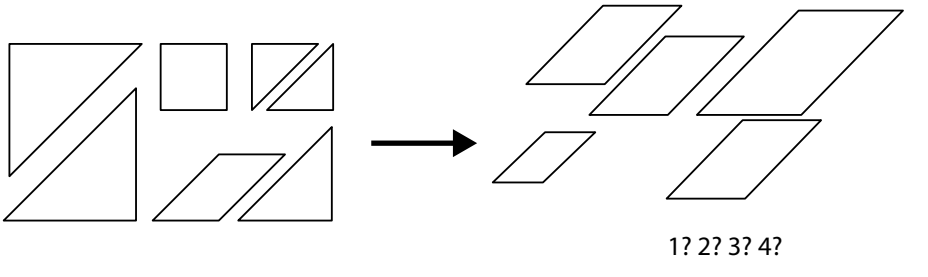
Divide the seven Tangram pieces into two groups: one consisting of the two large triangles, and the other consisting of the remaining five pieces.

Using the first group of two large triangles, create as many shapes as possible. For this puzzle, the two large triangles need not align fully along their edges; they can be aligned along a unit.

For each shape created, cover the two-triangle shape completely with the other group of five pieces.

Find at least five solutions.

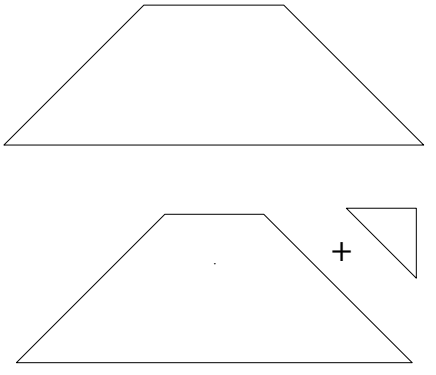
1.12. *Complete Parallelograms*



Make as many parallelograms as possible using all seven pieces of a single Tangram set. Each piece can be used only once.

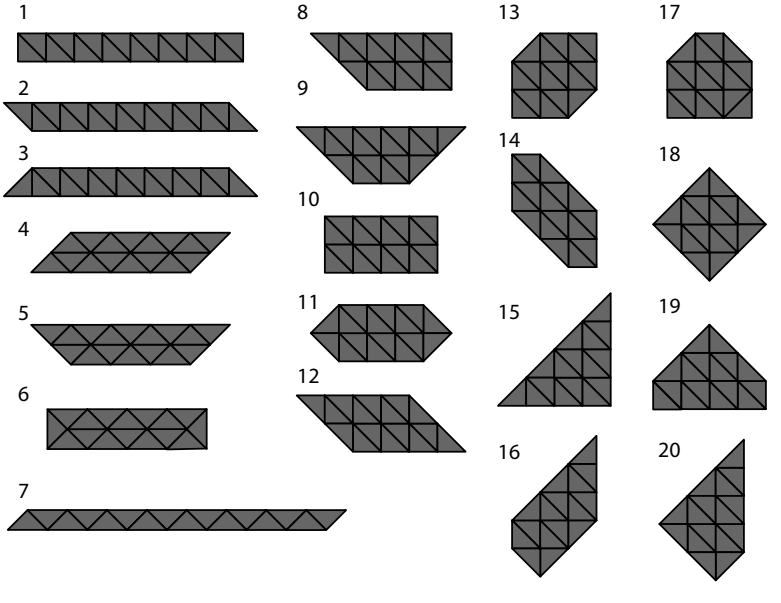
Note: For this puzzle, all the parallelograms must have two 45° angles.

1.13. *The Trapezium Paradox*



Make a trapezium using the seven pieces of a single Tangram set. Then take out a small triangle and make another trapezium.

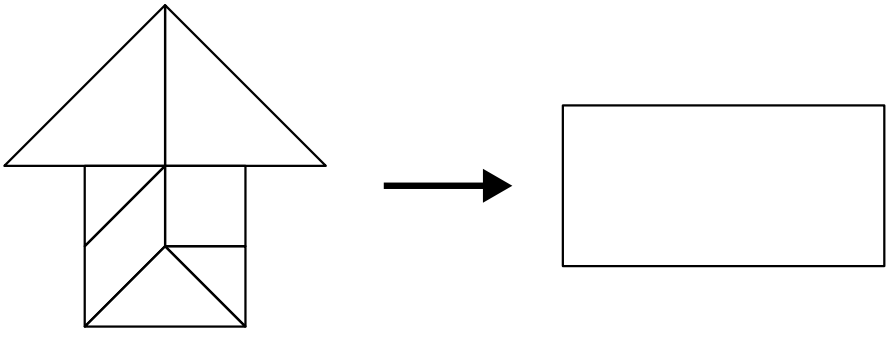
1.14. *The Convex Sixteen*



By using 16 right-angled isosceles triangles, you can make 20 convex shapes, as shown above.

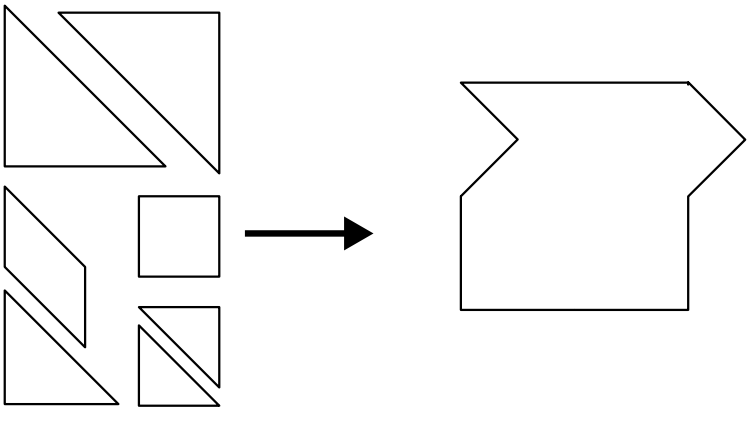
Which of them can be created using the seven pieces of a single Tangram set?

1.15. *The Arrow*



Step A: Divide the arrow shown above into three parts, with each part having a different shape.
Step B: Rearrange these three parts to get a rectangle.

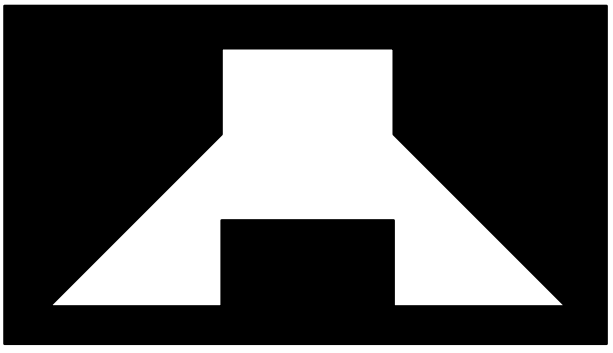
1.16. *The Bump*



Step A: Create the shape above using a full Tangram set.
Step B: Divide the shape into four identical parts.
Step C: Cut the shape into five identical parts without following the edges of the units. (This is a trick puzzle.)

This is the Tangram variation of a puzzle by **L. Vosburg Lyons**, USA.

1.17. *The Negative Puzzle*

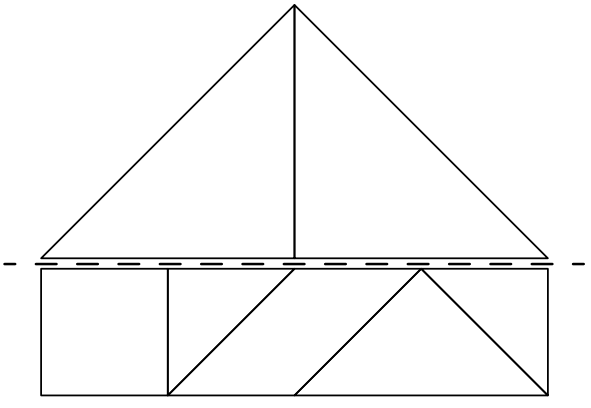


The white space inside the black frame is made up of the seven pieces of a Tangram set. Locate just two of the pieces in the white space so as to reveal the arrangement of the rest of the pieces.

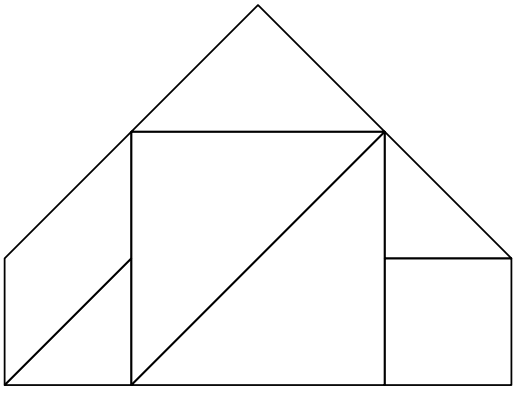
Solutions

1.1. *The House*

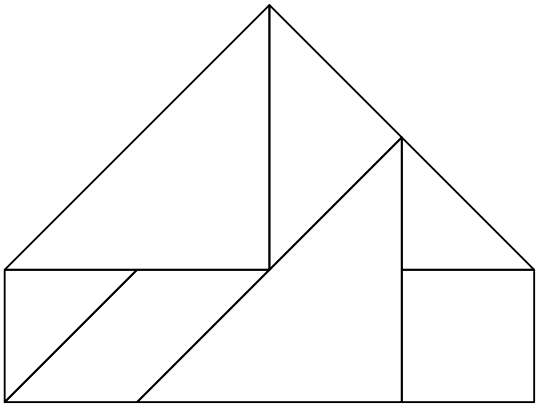
(a) "Cutting" along the dotted line divides the shape into two parts having the same area.



(b) "Folding" the five small pieces as shown below will cover the two big pieces.

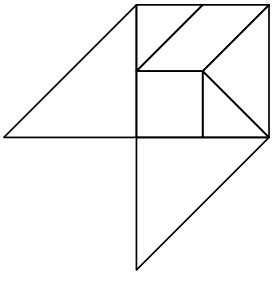


(c) The two large triangles are not connected by their edges.

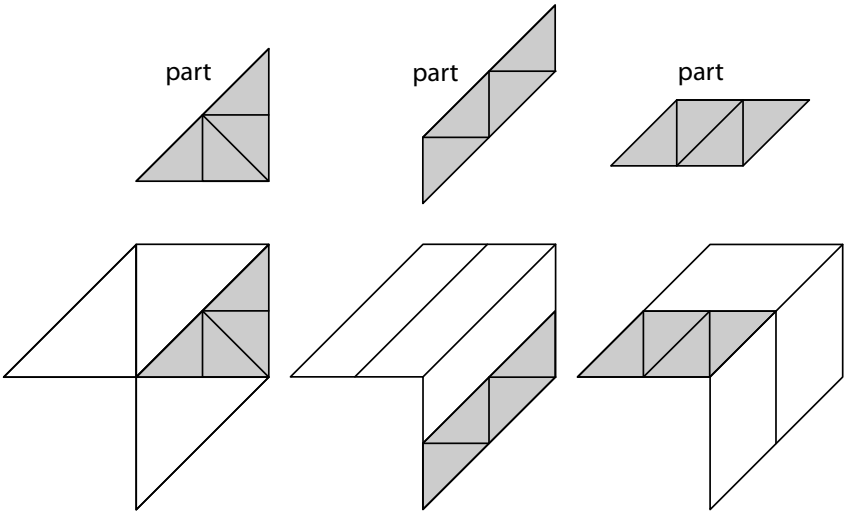


1.2. *The Rocket*

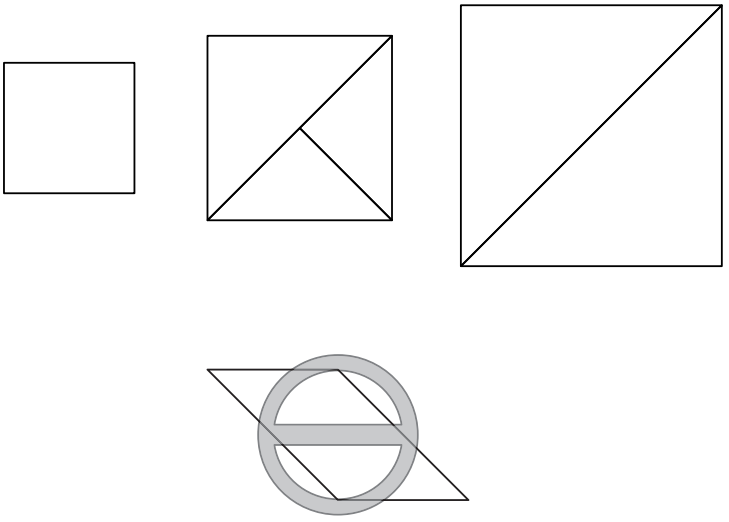
Step A



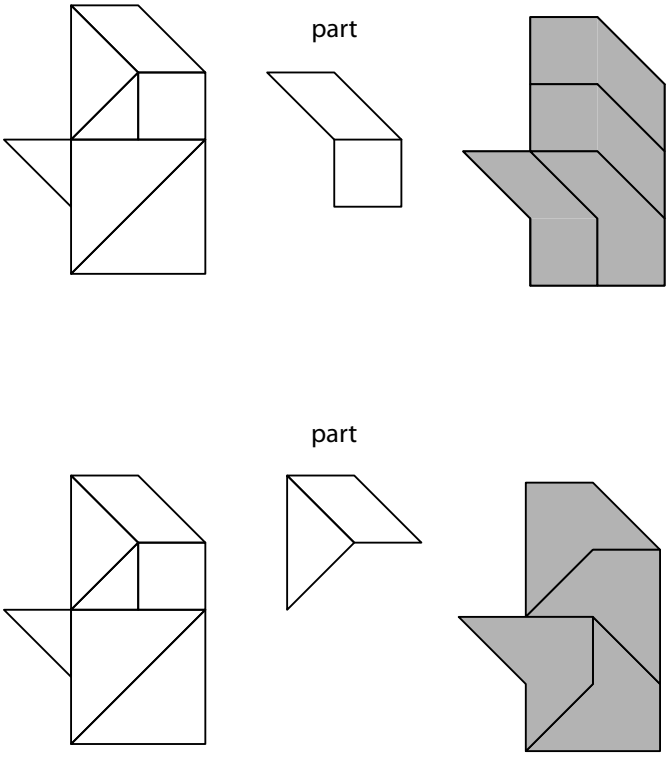
Step B



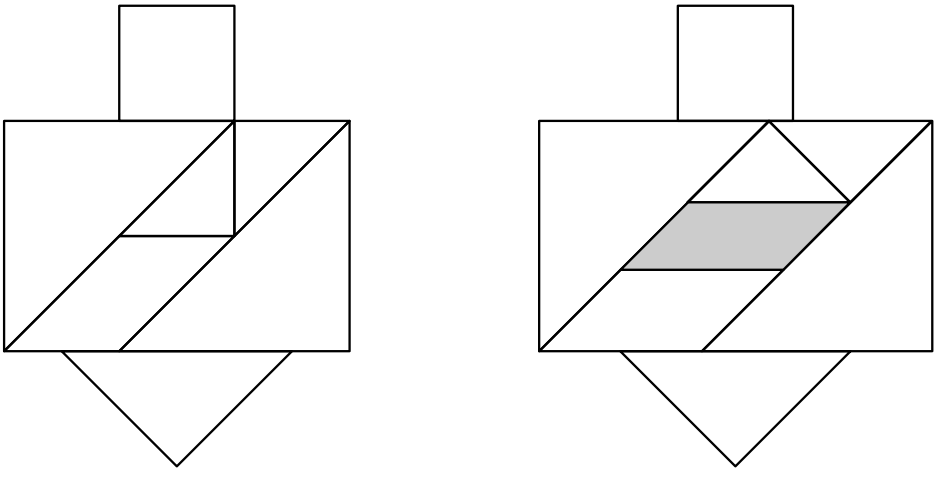
1.3. *Maximum Squares*



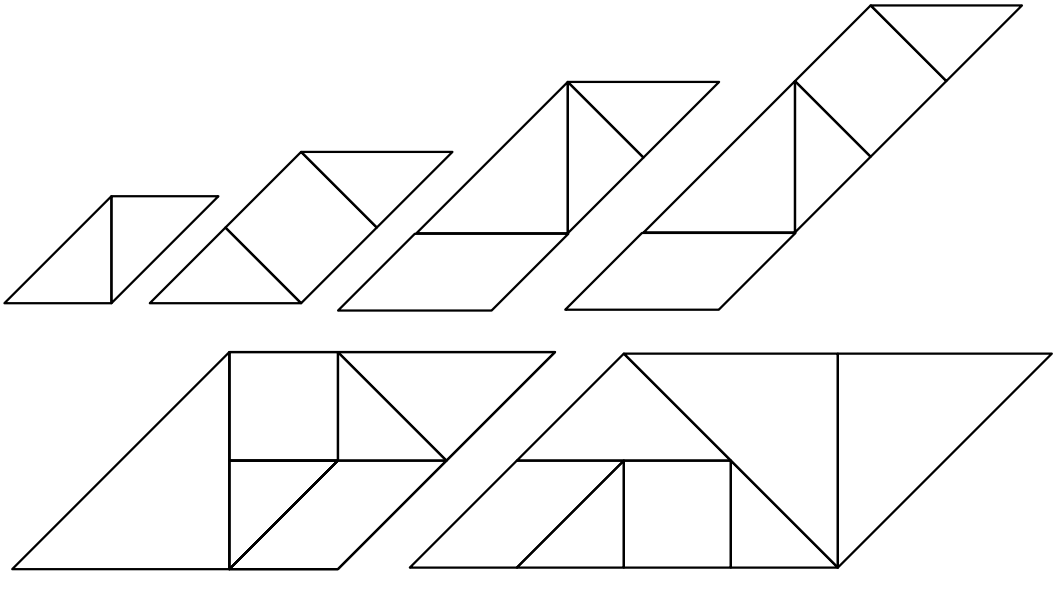
1.4. *The Hammer Head*



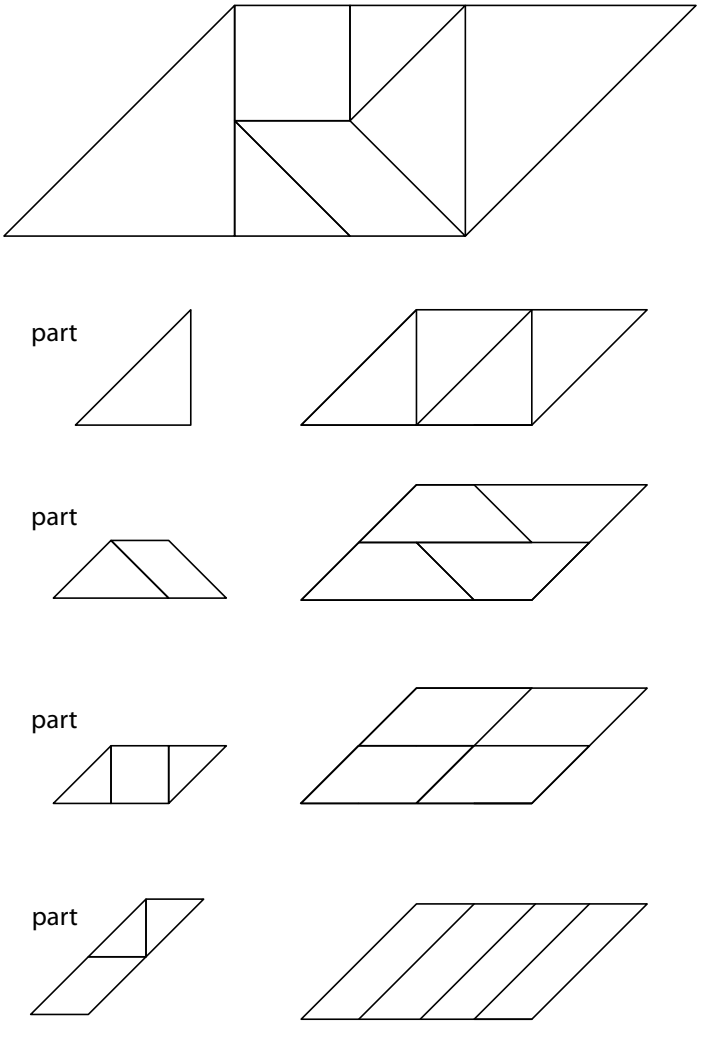
1.5. *The Spinning Top Paradox*



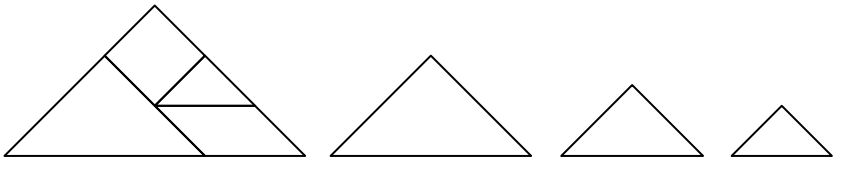
1.6. *Parallelograms*



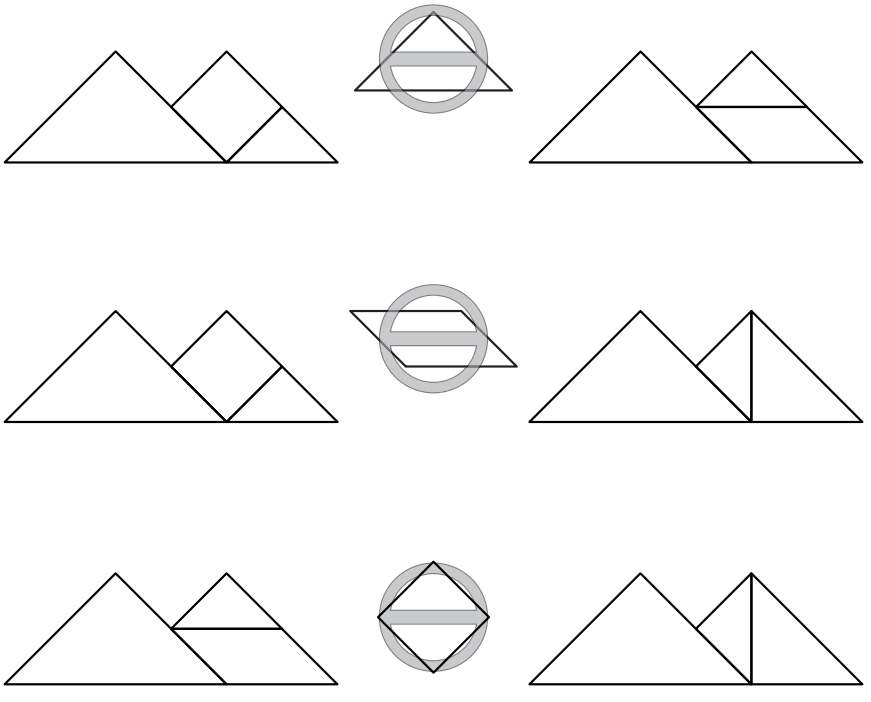
1.7. *The Wedge*



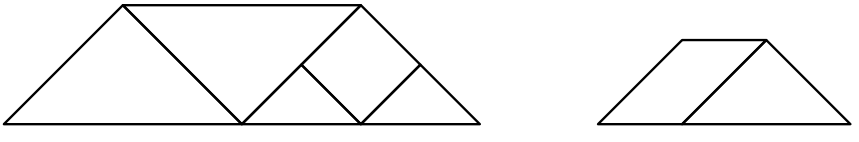
1.8. *Complete Triangles*



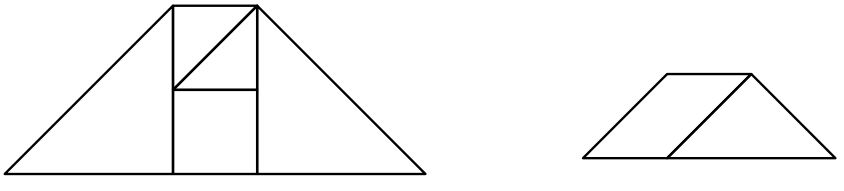
1.9. *The Mind Reader*



1.10. *Complete Trapeziums*

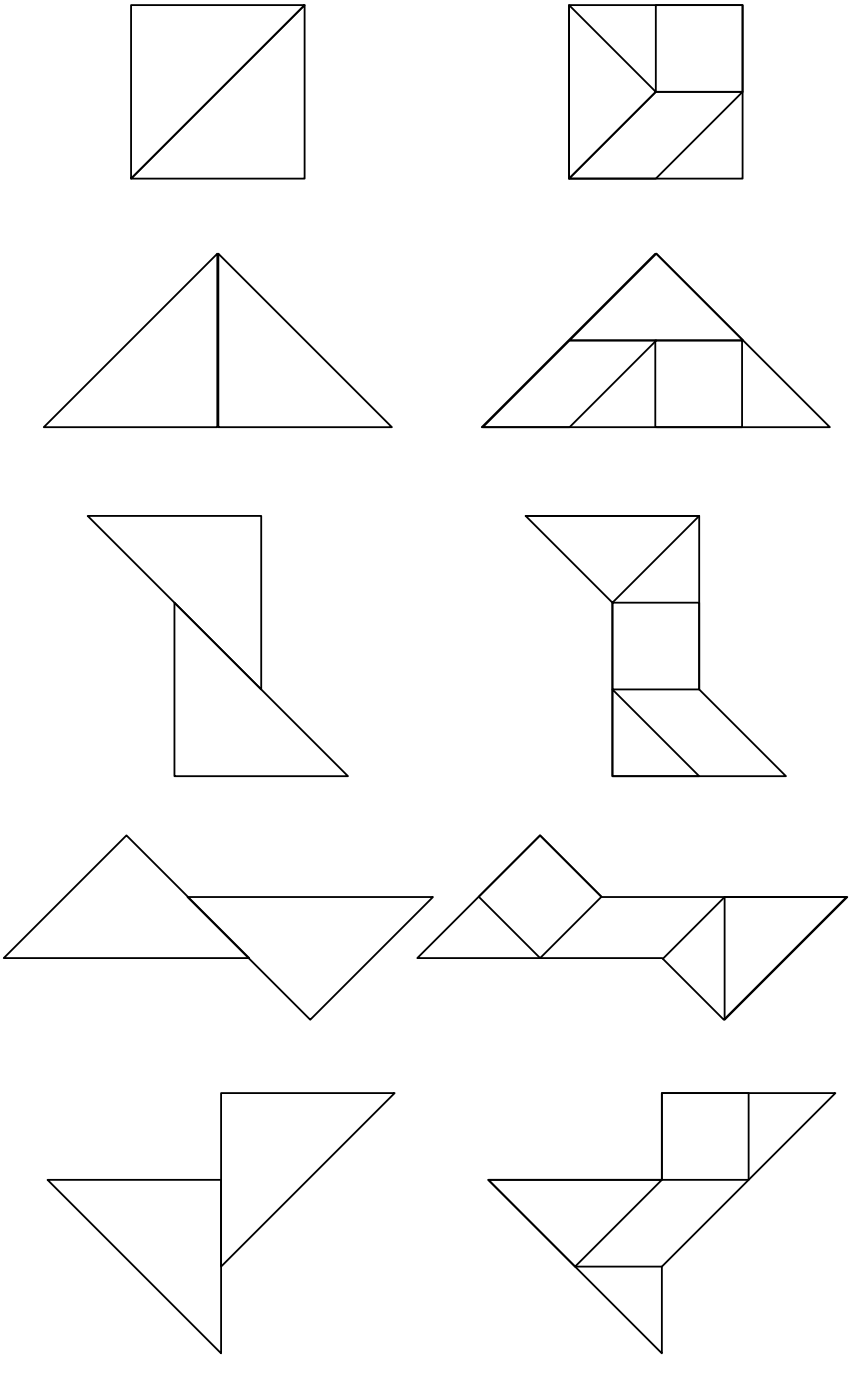


Another option

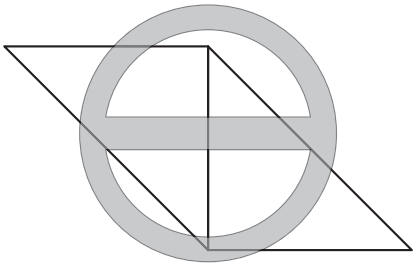


1.11. *The Triangle Dues*

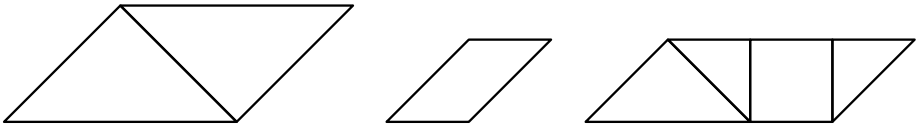
There are six possible shapes, but only five can be fully covered by the other pieces.



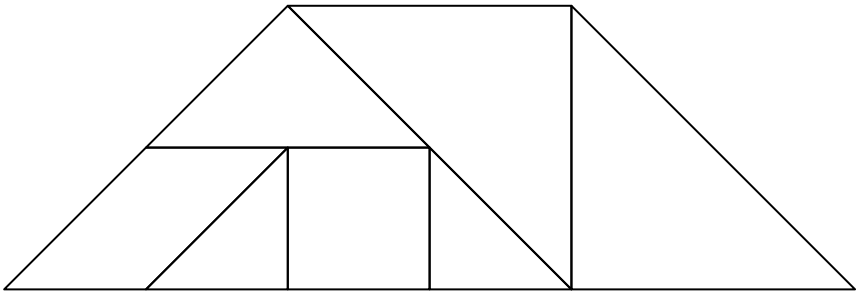
The following shape cannot be covered:

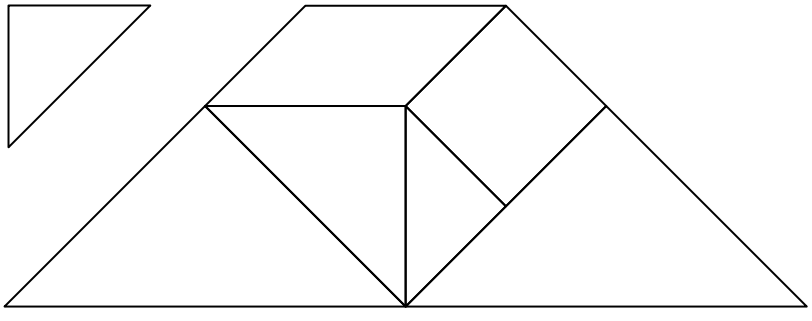


1.12. *Complete Parallelograms*

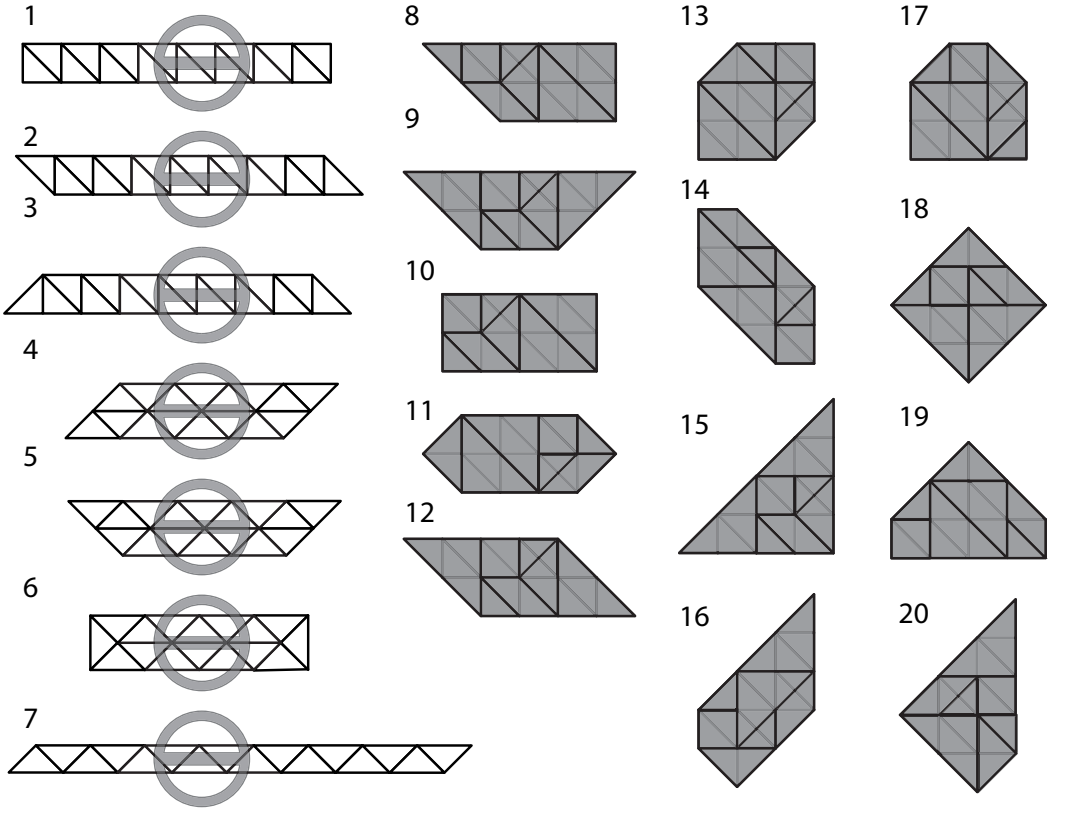


1.13. *The Trapezium Paradox*



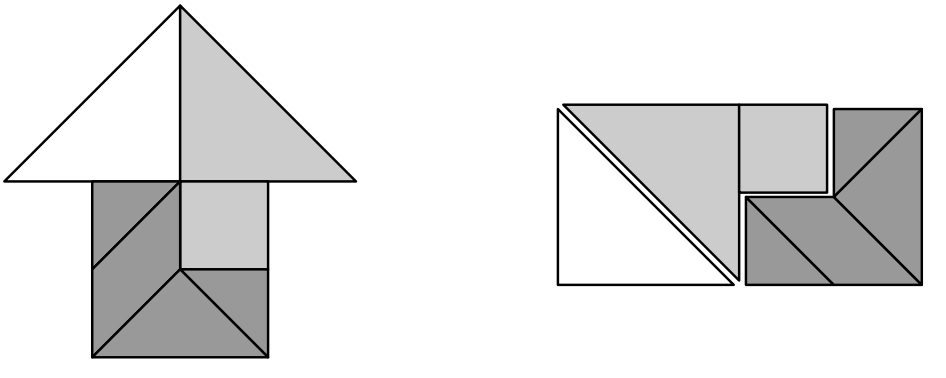


1.14. *The Convex Sixteen*

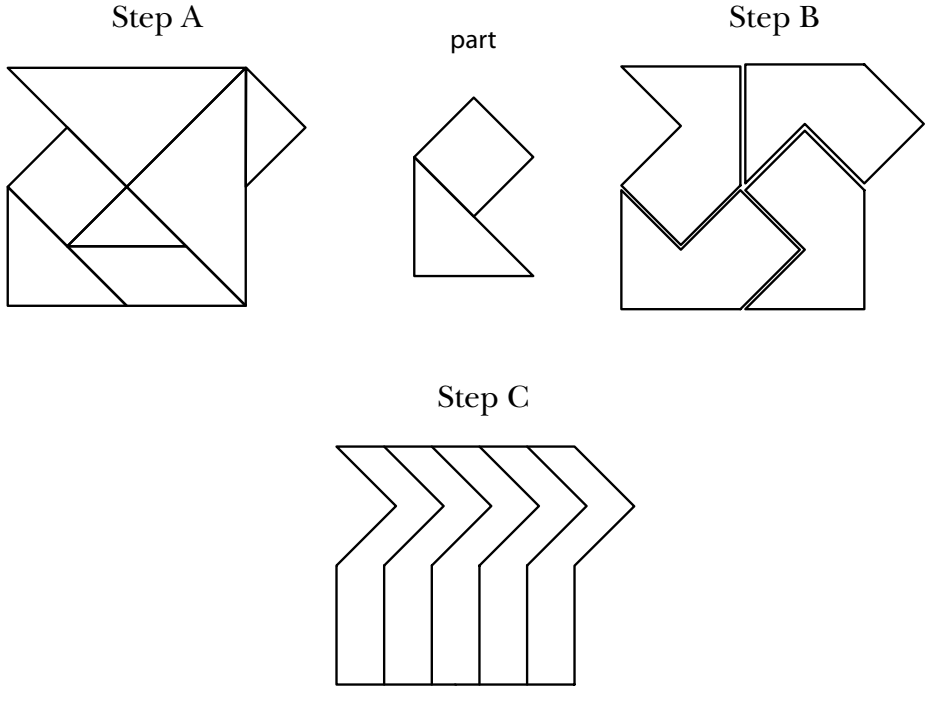


Shapes 1 to 7 cannot be created with a complete Tangram set.

1.15. *The Arrow*



1.16. *The Bump*



1.17. *The Negative Puzzle*