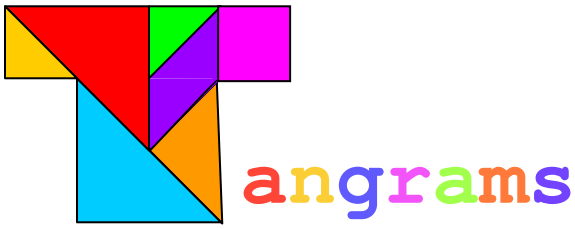
# Algebra/Geometry Institute Summer 2005

## Lesson Plan 3: Tangrams




**Faculty Name: Rayna McCarty**
**School: Parks Elementary**
**Grade Level: 5**

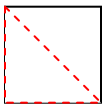
## 1 Teaching objective(s)

- Students will use tangrams to identify, describe, and compare geometric figures.
- Students will create a variety of geometric pictures and designs using tangram pieces.
- Students will develop spatial-visualization skills by using the tangram pieces.

## 2 Instructional Activities

*Becoming Familiar with the Pieces*

- Give each student a set of tangram pieces and allow them to play without instructions or guidance. Encourage them to experiment with the pieces.
- Tell the students, "Today we're are going to begin experimenting with the pieces that I have given you. These are called tangrams. You've had a little time to play with the pieces, now let's talk about them together."
  *An overhead projector is good for demonstration; you don't need a special set of tangrams because it will project a shadowed outline of each of the seven shapes.
- Ask the students how many pieces are in their puzzle. Have them sort the pieces into groups according to shape. Have students sort them by the number of sides. Ask how many squares there are. Triangles? Which is the parallelogram? (Give students time to answer, then discuss and show the correct answers).
- Compare the pieces of the tangram puzzle. Ask students to tell how the various pieces are alike and how they are different? Have them to look at the square and see what they notice about its corners. See if the students can find a triangle that has a square corner. Demonstrate by putting one piece on top of another.



- Have the students find a side of a triangle which is the same length as the sides of the square. Move the two sides together to show they are the same.

*Making New Shapes*

- Have the students use 2 pieces to make the square. Then, make a square from two other pieces.

- Have them to create a parallelogram.
- Ask the students to use two of the pieces to make a figure which is the same as another of their pieces.
- Next have them to use three pieces to make a house-shaped pentagon.

*Fill It Up*

- Give students a copy of the rabbit and the dog (attached). Notice that these designs have the shapes drawn in the picture. Have them practice placing the tangram pieces on the design in the correct places.
- Give students a copy of the giraffe and the cat (attached). Notice that these designs do not have the shapes drawn in the pictures. The students have to figure out where the pieces go in order to make the same shape. This is more challenging than having the lines provided for them. You may certainly create designs of your own that may be easier or harder for your particular students.
- Have the students create a tangram picture using all seven pieces on a white sheet of paper. Then have them trace the outside edge of the design, without drawing each individual shape (like the giraffe and cat were done). The students can then trade designs with a classmate and try to fill in one another's design with the tangram pieces. You may want to have your students do this activity a few times so that they become more comfortable with the pieces.

*TAN-men*

- Have each student create a person (TAN-man) out of the tangram pieces. Their person can be sitting, standing, running, jumping, etc. as long as they use all seven pieces. Encourage the students to play around with the pieces for a while before committing to the first thing they come up with. There is a wide variety of people that can be made using the tangram pieces. You may want to show them an example of one you've created if they are stuck (see attached). Challenge them to do something different from anyone else. You may want to spread them out, so that no duplicates would occur.
- After the students have created their person, have them draw the figure on a piece of construction paper drawing each individual shape. They may want to add a few features such as eyes or hair. You may let them if you want, but be careful not to distort the idea of only using the tangrams to create a person. The students may want to add too much to the picture, and the concept will be lost.
- Create a "TAN-men" bulletin board. You may want to have the students make the letters out of tangram shapes cut from construction paper. Every letter should be possible to make. Hang the students' TAN-men for everyone to see.

*Extensions*

- These activities can easily be extended or used to introduce or reinforce geometrical concepts such as congruency, similarity, symmetry, and so forth.

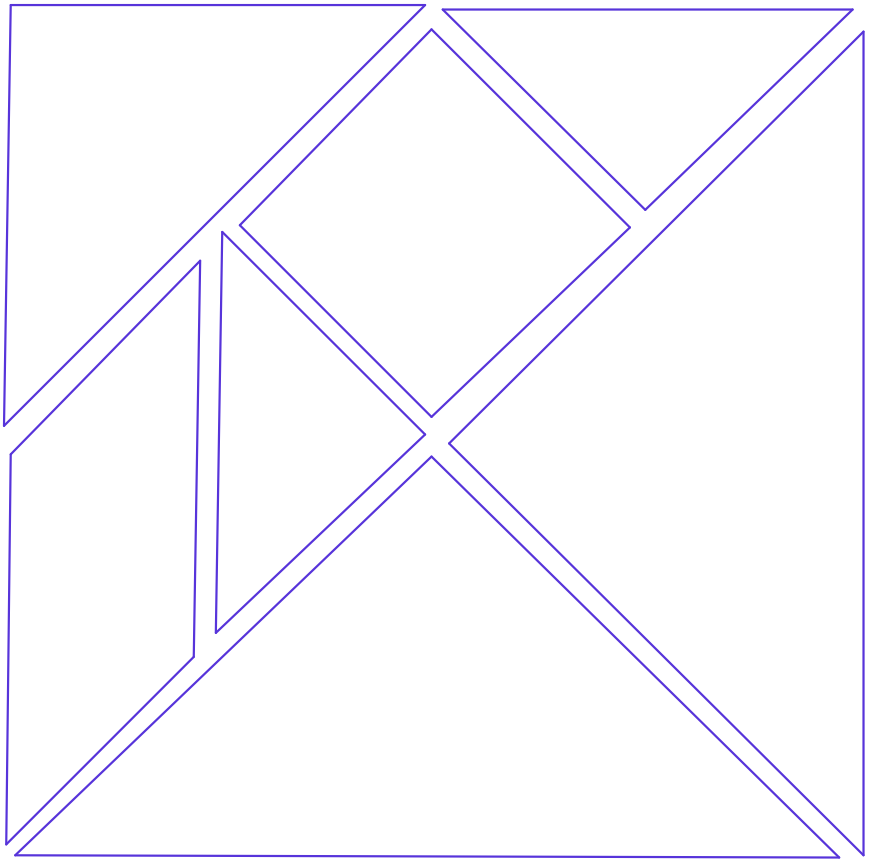
## 3 Materials and Resources

- Set of tangrams for yourself and each student (use attached pattern if you need to make them)
- Overhead projector (optional)
- Construction paper
- Pencils or Markers
- Copies of attachments for each student (rabbit, dog, cat, and giraffe)
- Copy of TAN-man to show example (or you may create your own)
- Bulletin board paper
- Fair, Jan. Tangram Treasury Book A. Cuisenaire Company of America, Inc. Copyright 1987 (lesson adapted from)
- Scavo, Tom. "The Math Forum." http://mathforum.org/trscavo/tangrams/tangram-pieces.html Updated August 5, 1996. Copyright 1994-2005.
- "Tangrams." http://tangrams.ca/inner/tanpages.htm. Updated September 27, 2003. Copyright 2003.

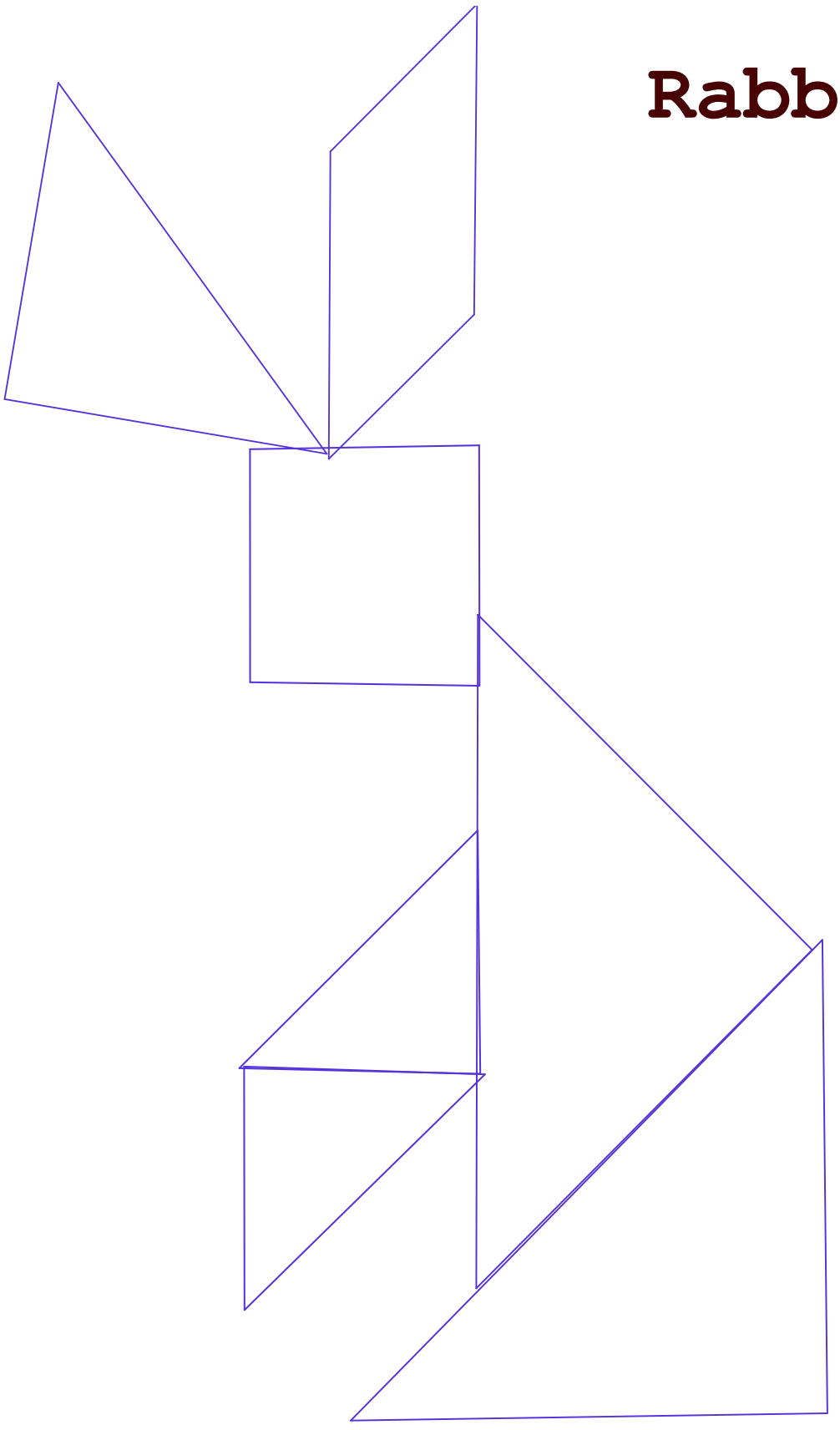
## 4 Assessment

- Teacher should walk around the classroom as the students work to ask questions like "What shape are you using?" "Are there two other pieces that could make that same shape?"
- Students will self check themselves as they fill in the tangram figures provided and the ones their classmates provide. They will be able to know if they can complete the figure or not.
- The TAN-men will be collected and checked for accuracy.

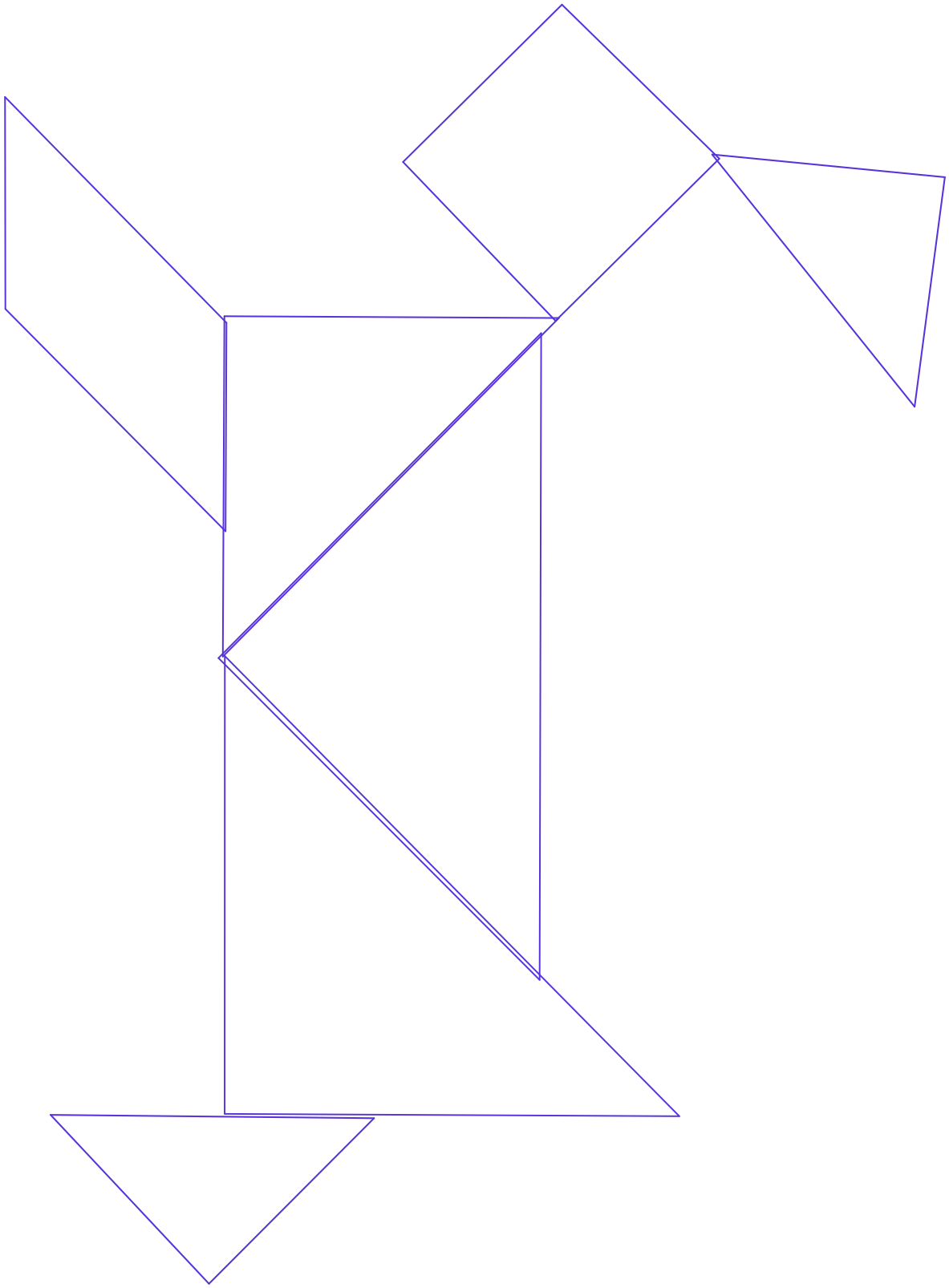
# Tangram Pieces



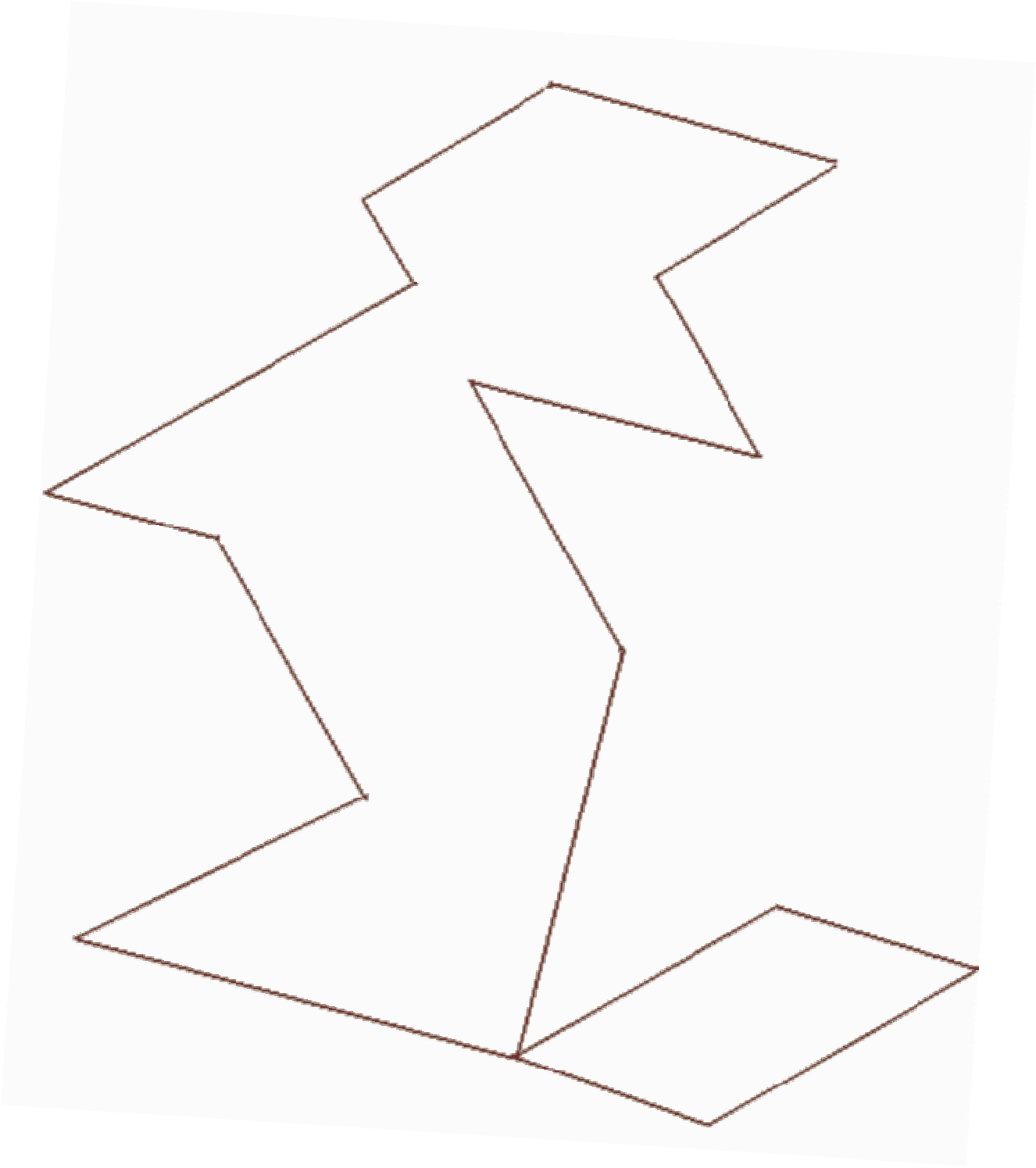
# Rabbit



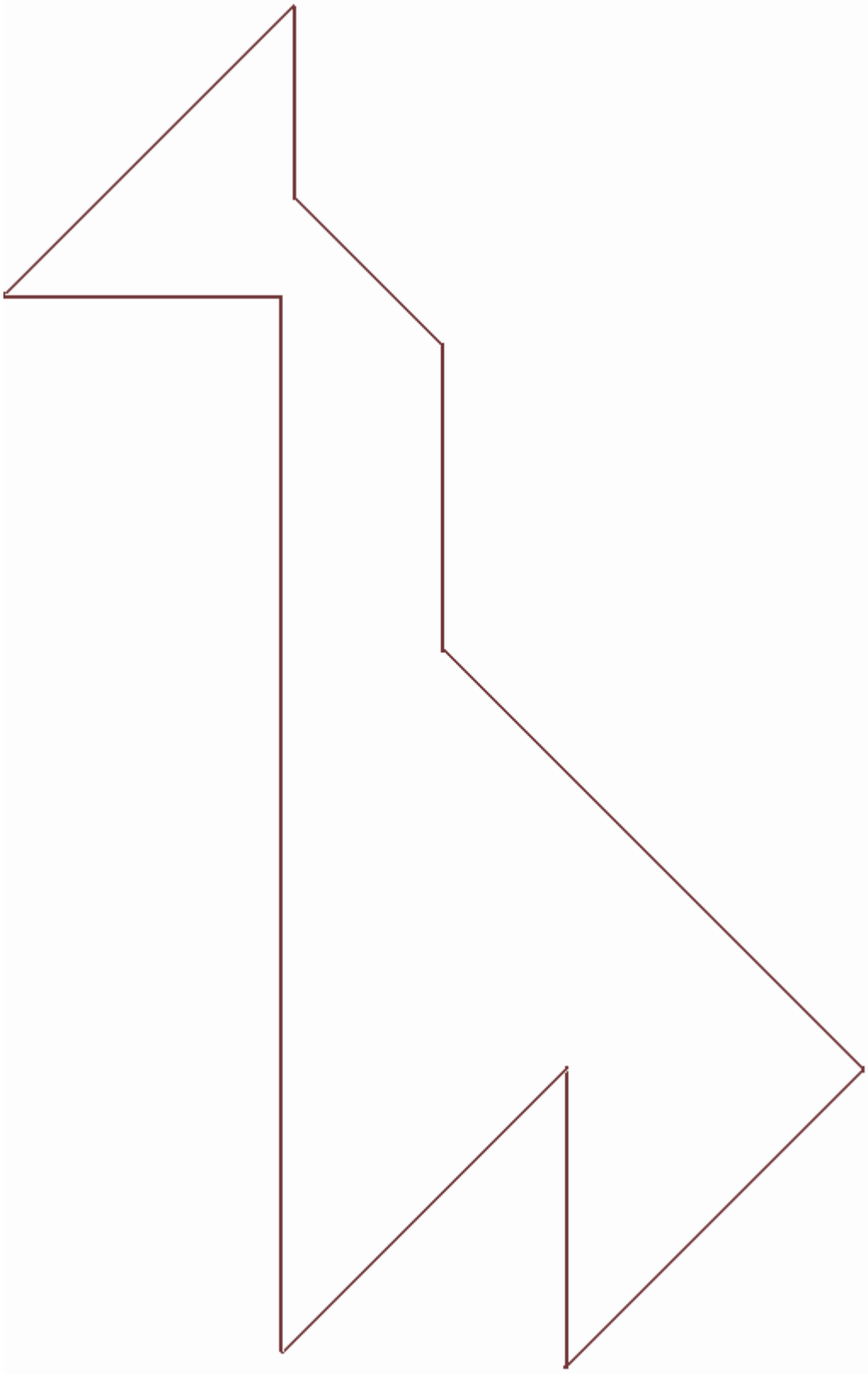
# Dog



# Cat



# Giraffe



# TAN–MAN