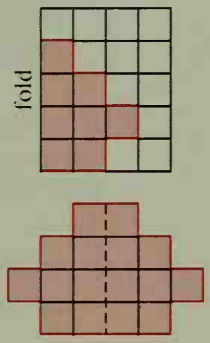
6. Create another closed path as in Exercise 5, but this time use a variety of different distances. What is the total number of degrees through which you turned?
7. Create a third closed path, but this time vary the angles at which you turn. What is the total number of degrees through which you turned? What theorem does this exercise suggest?

Reflection and Symmetry (Chapter 4)

Objective: Study the concepts of reflection and symmetry by using paper cutouts.

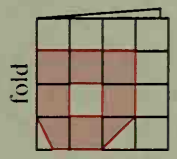


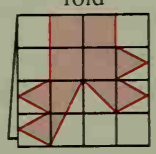
Flipping a jigsaw puzzle piece over exposes the cardboard back and makes it unusable in a puzzle. In geometry, however, the front and back of a polygon share many important features. We say that the original and the flipped versions are *congruent*. The two figures are called *mirror images* of each other because each looks like the other's reflection in a mirror. In fact, this type of transformation is called a *reflection*.

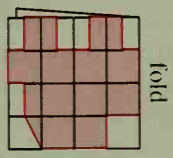
You can investigate reflections by folding graph paper along one of its lines and cutting along a path that begins on the fold line and ends somewhere else on the fold line. The resulting cutouts will have *mirror symmetry* across the fold line. The exercises will help you develop your skills in visualizing mirror symmetry.

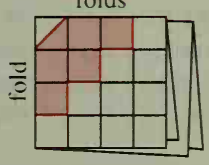
Exercises

For each figure, (a) sketch on graph paper the figure you would obtain if you were to cut out the figure along the red lines shown and open it up, and (b) test your predictions by actually cutting out the shapes.

1. 

2. 

3. 

4. 

5. **a.** Draw a line segment $\overline{AB}$ on a sheet of paper and then fold the paper so that A lies on top of B.
   b. Cut the paper so that when it is opened an isosceles triangle is formed with $\overline{AB}$ as its base.
   c. What does your cut-out triangle tell you about the angles at A and B? Explain.