Getting an Angle on Geometry

If, like **June Sakamoto**, you enjoy creative arts like **origami** (or-ee-GAH-mee) — Japanese paper-folding — you're already using basic geometrical shapes.

If you do carpentry or quilting, you work with lines and angles: that's geometry. If you install wall-to-wall carpeting, you can figure out the area of a room: that's geometry, too. So learning geometry isn't just for passing math tests on the GED.

LEARNING THE SHAPES

The most common geometrical shapes are called polygons. Polygons are **closed figures** made of straight lines. The straight lines form the **sides** of the polygon.

closed figure: a polygon

open figure: not a polygon

In any polygon, each side connects with two other sides. Wherever two sides meet, they form an **angle** — the space between the intersecting sides that is measured in units called degrees.

angle

90°

For example, here's a familiar polygon — a rectangle — with four angles that measure 90 degrees each. Degrees are indicated by a small circle after the number.

90°
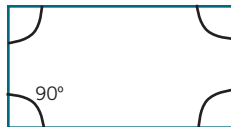
There are many different types of polygons. Each polygon is defined by how many sides it has. Each polygon has a specific number of degrees its angles add up to.
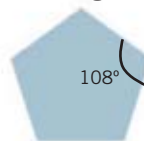
90°
45°
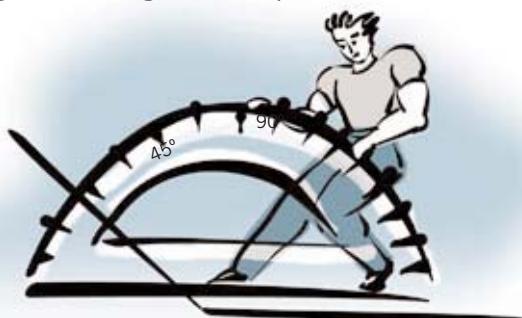
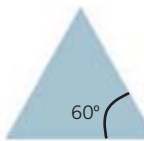## MATCH EACH POLYGON BELOW WITH ITS DEFINITION.

1. Square or Rectangle

   90°

2. Pentagon

   108°

3. Triangle

   60°

4. Hexagon

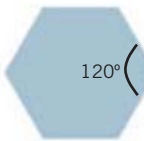   120°

5. Octagon

   135°

a. 3-sided figure. Its angles always total 180 degrees.
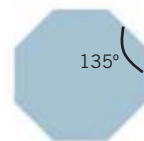
b. 8-sided figure. Its angles always total 1080 degrees.

c. 6-sided figure. Its angles always total 720 degrees.
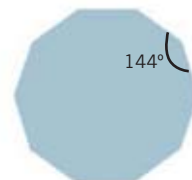
d. 4-sided figure. Its angles always total 360 degrees.

e. 5-sided figure. Its angles always total 540 degrees.

**WHAT IS THE NAME OF THIS MYSTERY POLYGON?**
a) nonagon (9 sides)
b) decagon (10 sides)
c) heptagon (7 sides)

144°

Answers: 1-d; 2-e; 3-a; 4-c; 5-b. The mystery polygon is a decagon. Its angles total 1440 degrees.

A LOVELY SHAPE

The art of **origami** transforms geometric shapes into fanciful creations. Here's an easy shape to make with a young child. At the end, the child will have had a lesson in geometry — with a paper heart as a souvenir.
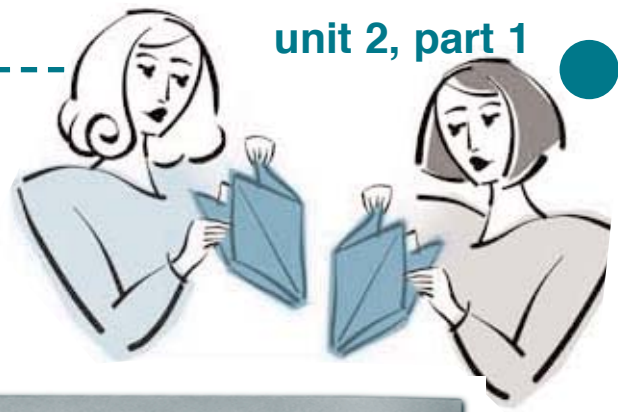
Step 1: Find or cut a piece of colorful paper into a rectangle that is $8\frac{1}{2}$" by $2\frac{1}{2}$".

Step 2: Spread out the paper with its long sides on the top and bottom. Fold it in half, left side to right side, and unfold it. There should be a crease in the middle, like this:
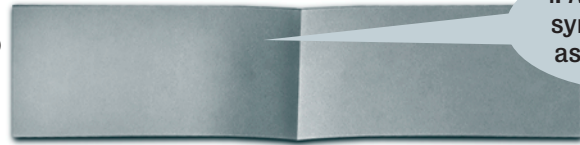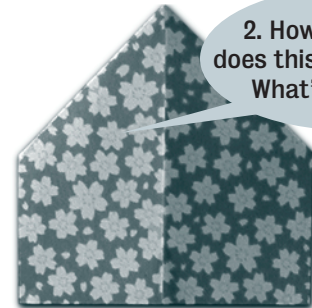
1. Are the halves symmetrical or asymmetrical?

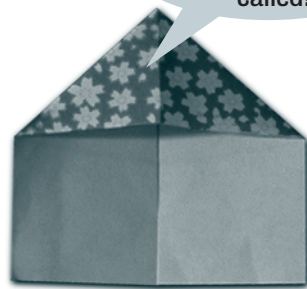**Step 3:** Fold the top left edge to run alongside the crease, to look like this:

2. How many sides does this polygon have? What's its name?

Step 4: Fold the top right edge to run alongside the folded-over paper, to look like this:

3. What's this polygon made by the flower pattern called?

Step 5: Turn the paper over and then upside down, like this. Fold down the four corners at the top.
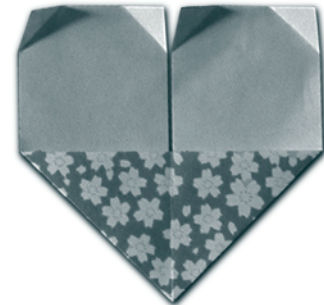
Step 6: Turn the paper over. Does your heart match this one?

Answers: 1. symmetrical, because they match **2.** 5 sides; a pentagon **3.** a triangle

TV411® Think Math, Education Development Center, Inc., © 2005

Build Your Vocabulary

SYMMETRICAL/ASYMMETRICAL.

Something that is symmetrical (sim-MET-tri-cal) means that when it's divided down the middle, both halves are the same. Something that's asymmetrical (A-sim-MET-tri-cal) is not the same on both sides when it's divided down the middle.
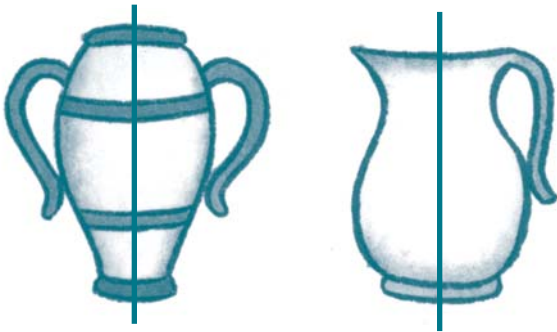
Did you know? Often the prefix *a* at the beginning of a word means *not*. Thus: *a*typical means *not* typical.

1. Circle the items that are **asymmetrical.**

a.

b.

c.

d.

e.

f. **A**

g. **G**

FILL IN THE BLANK

Fill in the blank with either **symmetrical** or **asymmetrical**.

2. Scientists theorize that people find _____ faces beautiful because uniform features suggest health.

3. Emma prefers the look of _____ clothes, such as her dress with one sleeve and her hat with a flower on the left side.

4. Tom chipped his tooth, making his once perfect smile _____.

5. If it weren't for its damaged wing, the butterfly would be _____.

ALL IN A WORD

Words have a life and a story to tell. The history of a word is called its ETYMOLOGY (eh-tim-MOL-uh-gee). It includes facts such as the language where the word originated, when it was first used, and how it has changed. For example, the etymology of the word symmetry is the Greek word "symmetros," which means "same measure."

SYMMETROS

Answers: 1. b, d, g; **2.** symmetrical; **3.** asymmetrical; **4.** asymmetrical; **5.** symmetrical