Patty Paper Worksheet 1

Welcome to geometric investigations with patty paper!

Patty paper is a thin wax paper commonly used between uncooked hamburger patties. They are conveniently cut into 5.5" or 6" squares which is useful to have during geometric investigations.

The patty paper game rules: You are allowed to use

1. lots of patty paper (notice that they are semi-translusent and have straight edges), and
2. a pencil.

Notice that you can record distances by making marks on the paper and you can even compare two distances in this way. However, you are *not* to use rulers to measure distances nor protractors to measure angles.

Vertical Angles

inspired by Michael Serra's *Patty Paper Geometry*.

1. Fold a line on a patty paper. Unfold. Fold a second line intersecting the first line. Unfold.

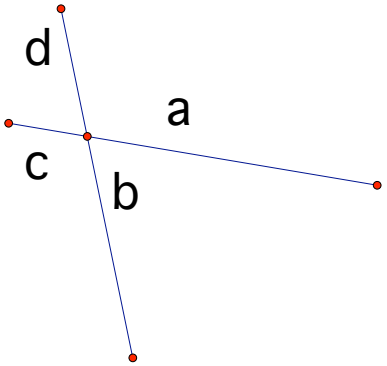
2. Notice there are four angles surrounding the intersection of the two lines. Label them a, b, c, and d so that you can refer to each by name.

3. Are any angles the same? Are all the angles different?

4. Explain what steps you took so that you could compare one angle to another. Consider drawing pictures if that helps clarify your steps.

5. Repeat steps 1 and 2 and see if the observations you make in Step 4 still apply to a different pair of lines.

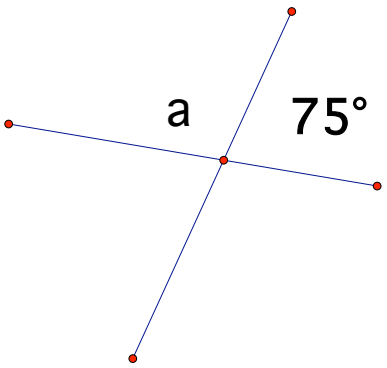
6. The pairs of opposite angles formed by two intersecting lines are called *vertical angles*. For example, in the diagram to the right, $\angle a$ and $\angle c$ are a pair of vertical angles. Restate your conclusions in 4 using this new terminology.

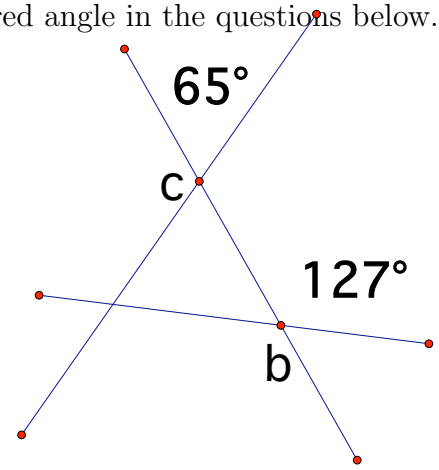


7. Two angles that have a common vertex, share a side, and do not overlap are *adjacent angles*. For example, $\angle a$ and $\angle b$ are adjacent angles. Can you say anything about the pairs of adjacent angles above?

8. Two angles whose measures add up to $180°$ are called *supplementary* angles. Are all adjacent angles also supplementary? Either justify yourself of provide a counter example.

Use your conclusions on the front page of this worksheet and any other geometric knowledge to calculate the measure of each lettered angle in the questions below.





9. Origami directions usually start with a square piece of paper, but 8.5"×11" paper the new norm. How can you determine what amount to cut off of a rectangular 8.5"×11" paper without making use of a ruler? On a separate piece of paper, give the algorithm and then *justify* that your steps guaranty a square.