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 origami practice or for geometric investigations.

Patty Paper Rules

Just as video games, car drivers, and people in general have rules that must be respected, our geometric investigations are going to have a set of rules. A few years ago most geometry classes would only let students use a compass and straightedge (no rulers or protractors!). The calculus classes on campus will let students use rulers, protractors, and calculators but no graphing calculators. Every class and in particular, every math class, is usually explicit about what tools the students are allowed to use in order to solve problems, that is, they lay out the 'rules'.

In this class we will have the patty paper game rules:
You are allowed to use:

1. lots of patty paper (notice that they are semi-translucent and stackable!),
2. the assumption that the patty paper is a square,
3. a pencil (or pen, colored pencil, crayons, etc),
4. a calculator (of any kind),
5. your senses (seeing, hearing, feeling, etc), and
6. logic.

Explicitly that means you are *not* allowed to use: an already made ruler or an already made protractor.

Despite these restrictions you will be able to complete many tasks. For example, while distances can't be measured, we can make a record of it by making marks on the paper. With this record of distance we can compare distances to each other to determine which is longer or if they are the same length. As the investigations go on you will discover your own methods and should build your own 'tool set' of techniques.

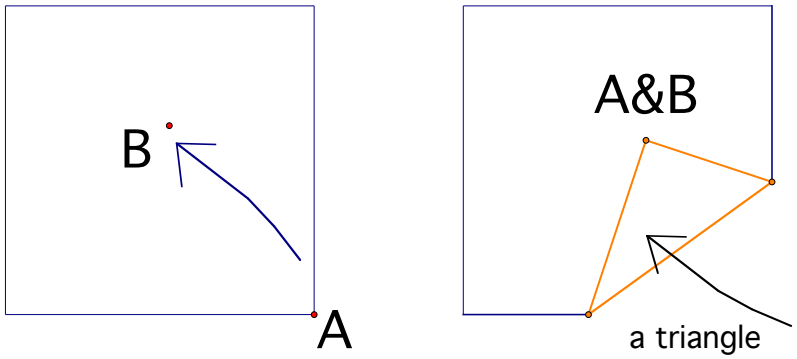
The worksheets are designed to be started in class and finished as part of your homework. These problems are intentionally non-standard so that you can practice scientific thinking when working on them (SLO #2 #4 & #5) and then develop technical communication skills when writing your solutions (SLO #3). Your finished worksheet should be easy to read with complete sentences, correct grammar, and precise language. You *will* need to reread, edit, and rewrite your solutions and should *not* be turning in a first draft.

Folding TUPs

inspired by Kazuo Haga's "Folding Paper and Enjoy Math: Origamics" in *Origami: Third International Meeting of Origami Science, Mathematics, and Education.*

1. Take a piece of patty paper and label the lower right-hand corner A. Pick a random point on the paper and label that point B.

2. Fold the paper so that A lies on top of B. This creates a flap of paper, called the Turned-Up Part (or TUP for short).



3. [1] How many edges does your TUP have? Three? Four? Five?

   For instance, in the example depicted above, the TUP has three sides.

4. [7] Experiment with many TUPs to find an answer to the question, "How can we tell how many edges a TUP will have before we even fold the paper?"

5. [7] What if we allowed the point B to be outside the square? "How can we tell how many edges a TUP will have before we even fold the paper?"

You must find complete answers for question 4 and 5 and write up your solutions individually or in groups of two. You answers must be on a separate page and you are encouraged to include pictures!