# 2 Dimensional Congruence

definitions & theorems from Origametry by Daniel Heath.

While working in a group make sure you:

- Expect to make mistakes but be sure to reflect/learn from them!
- Are civil and are aware of your impact on others.
- Assume and engage with the strongest argument while assuming best intent.

Mark distinct $A$ and $B$ points on a patty paper. Use a ruler to measure the distance $AB$, and then mark any other two points $C$ and $D$ so that $AB = CD$.

1. Can you find a fold $\phi$ so that $\phi(\overline{AB}) = \overline{CD}$. (Note that if $S$ is a set, we define $\phi(S) = \{\phi(X) | X \in S\}$).

2. Can you find a fold $\phi$ so that $\phi(A) = C$ and $\phi(B) = D$? If so describe how to define $\phi$ given arbitrary points $X$, $Y$, $Z$, and $W$ so that $XY = ZW$.

3. Can you find a fold $\phi$ so that $\phi(A) = D$ and $\phi(B) = C$? If so describe how to define $\phi$ given arbitrary points $X$, $Y$, $Z$, and $W$ so that $XY = ZW$.

4. Recall in 1 dimension that a translation by $t$ (where a point with coordinate $x$ was shifted to coordinate $x+t$) could be created by composing two folds. Can translations be created in 2 dimensions as well? If so, describe how. If not, explain why not.

5. Consider composing two folds $\phi_1$ and $\phi_2$ with respective creases that intersect. Describe the effect.