



Open Investigation 1.1

THE INTERSECTION OF TWO LINES

Step 1: Fold a line on a patty paper. Unfold. Fold a second line. Unfold.

Step 2: Repeat step 1 on several pieces of patty paper. How many times can two lines cross each other? (If the lines don't intersect on the patty paper, think about what would happen if the lines were extended indefinitely.)

Write your conjecture about how many points of intersection are possible when folding two lines on the same patty paper.



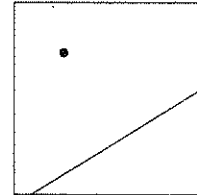


Open Investigation 1.2

FINDING THE SHORTEST DISTANCE BETWEEN A POINT AND A LINE

You can use the edge of a patty paper to measure and compare distances and lengths by making marks along the edge of the paper.

Step 1: Use your straightedge to draw a line on your patty paper. Draw a point that is not on the line.



Step 2: Use another patty paper and experiment to find the shortest distance from the point to the line.

Describe the method you used to find the shortest distance from the point to the line. (A diagram might be useful, too.)

Write a conjecture about the shortest distance from a point to a line.

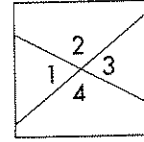




Open Investigation 1.3

VERTICAL ANGLES

Definition: The pairs of opposite angles formed by two intersecting lines are called **vertical angles**. For example, in the diagram on the right, $\angle 1$ and $\angle 3$ are a pair of vertical angles, and $\angle 2$ and $\angle 4$ are a pair of vertical angles.



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

Step 2: Label the angles as in the diagram above.

Step 3: What seems to be true of vertical angles? Experiment by folding and/or tracing the angles.

Write your conjecture about the relationship between a pair of vertical angles.



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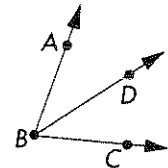
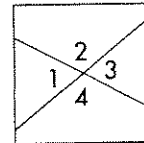


Open Investigation 1.4

ADJACENT ANGLES AND LINEAR PAIRS

Definition: Two angles are called **adjacent angles** if they share a common vertex and a common side but no common interior points. In the diagram to the far right, $\angle ABD$ is adjacent to $\angle DBC$.

Definition: A pair of adjacent angles formed by two intersecting lines is called a **linear pair**. For example, in the diagram on the right, $\angle 1$ and $\angle 2$ are a linear pair of angles, and $\angle 3$ and $\angle 4$ are a linear pair of angles.



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

Step 2: Label the angles as in the diagram above.

Step 3: Name each pair of adjacent angles on your patty paper.

Step 4: What seems to be true about each linear pair of angles?

Write your conjecture about the sum of the measures of a linear pair of angles.



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