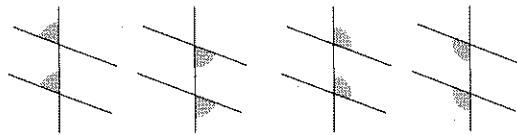




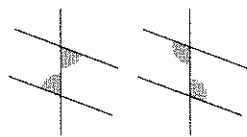
Guided Investigation 4.3

PARALLEL LINES CONJECTURE

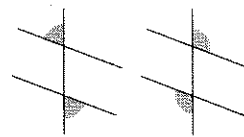
You have already investigated some properties of parallel lines. You found that when two parallel lines are intersected by a line perpendicular to one of the lines, that line must be perpendicular to the other line. You used this idea to construct a line parallel to a given line. In this investigation you will look at what happens when two parallel lines are intersected by a third line (transversal) that is not perpendicular to the original lines. Three different kinds of pairs of angles are formed. The diagrams below name these different kinds of pairs.



corresponding angles

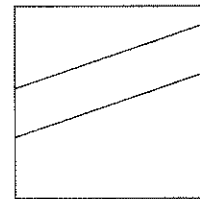


alternate interior angles

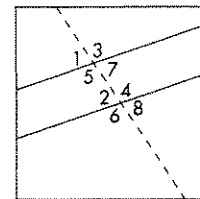


alternate exterior angles

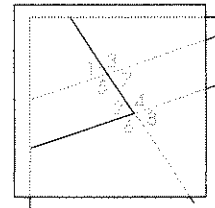
Step 1: Draw a pair of parallel lines on a patty paper.



Step 2: Fold or draw a line that intersects the two parallel lines. Label the angles as shown in the diagram.



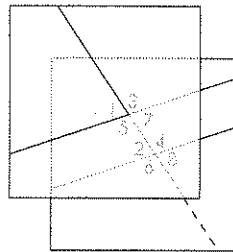
Step 3: Choose a pair of corresponding angles, for example, $\angle 1$ and $\angle 2$. Use another patty paper and copy $\angle 2$.



Guided Investigation 4.3 continued

PARALLEL LINES CONJECTURE

Step 4: Place the second patty paper over the first to compare the measures of $\angle 1$ and $\angle 2$.



Step 5: Repeat steps 3 and 4 for a pair of alternate interior angles and a pair of alternate exterior angles.

Compare your results with the results of others near you. You have made discoveries about three types of congruent angles formed when two parallel lines are intersected by a transversal. See if you can combine these findings into one conjecture.



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If two parallel lines are cut by a transversal, then _____

_____. (Parallel Line Conjecture)

Explain why it must be true that if corresponding angles are congruent, then alternate interior angles and alternate exterior angles must also be congruent.
