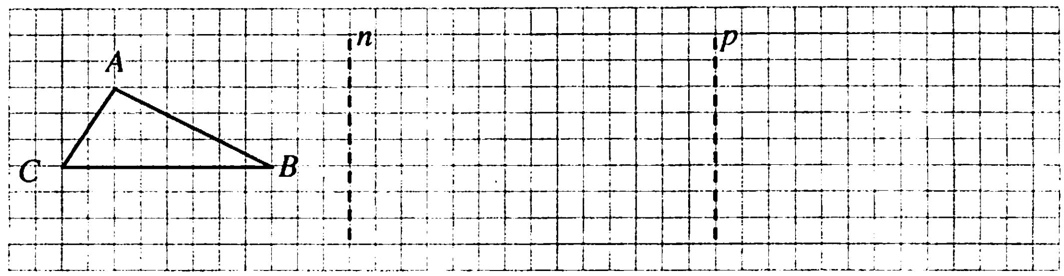
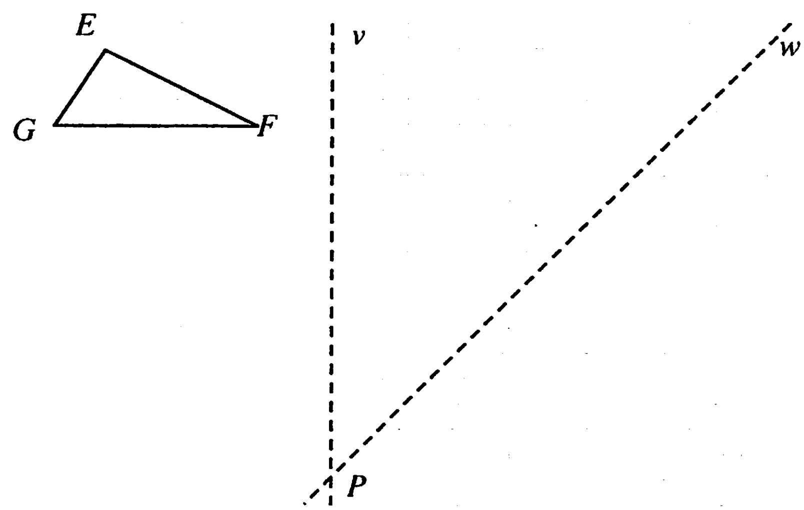
Reflections

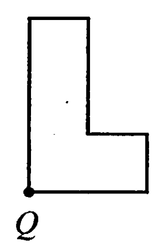
1-59. What happens when ΔABC is reflected across line n to form $\Delta A'B'C'$ and then $\Delta A'B'C'$ is reflected across line p to form $\Delta A''B''C''$? First **visualize** the reflections and then test your idea of the result by **drawing** both reflections. Then answer the rest of the questions in the student text.



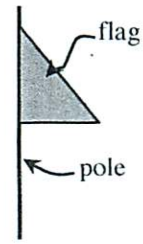
1-60. a. First **visualize** the result when ΔEFG is reflected over v to form $\Delta E'F'G'$, and then $\Delta E'F'G'$ is reflected over w to form $\Delta E''F''G''$. Then **draw** the resulting reflections on the resource page. Is the final image a translation of the original triangle? If not, describe the result. Then answer question (b) as stated in the text.



c. On the grid below, rotate the "block L" 90° counter-clockwise (↺) about Q.



1-49. When Kenji spun the flag shown at right very quickly about its pole, he noticed a three-dimensional shape emerge.

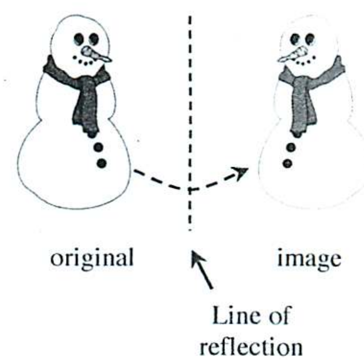


a. What shape did he see? Draw a picture of the three-dimensional shape on your paper and be prepared to defend your answer. **[He saw a cone.]**

b. What would the flag need to look like so that a **sphere** (the shape of a basketball) is formed when the flag is rotated about its pole? Draw an example. **[It should have a semi-circle attached to the pole along its straight edge.]** / or circle

1-50. REFLECTIONS

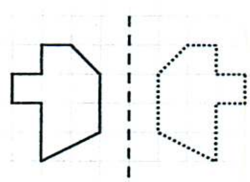
The shapes created in the Kaleidoscope Investigation in Lesson 1.1.5 were the result of reflecting a triangle several times in a hinged mirror. However, other shapes can also be created by a reflection. For example, the diagram at right shows the result of reflecting a snowman across a line.



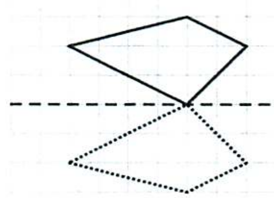
a. Why do you think the image is called a reflection? How is the image different from the original? **[Typical response: "It's like what happens in a mirror: the left side flips over to the right side."]**

b. On the Lesson 1.2.1 Resource Page provided by your teacher, use your visualization skills to predict the reflection of each figure across the given line of refection. Then draw the reflection. Check your work by folding the paper along the line of reflection.

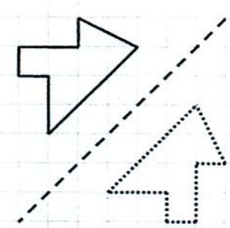
(1)



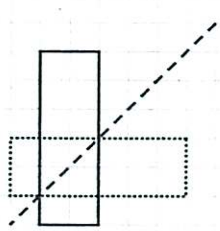
(2)



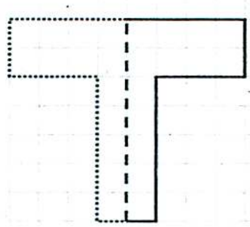
(3)



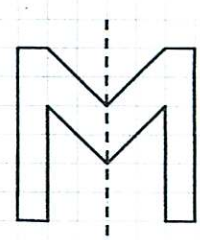
(4)



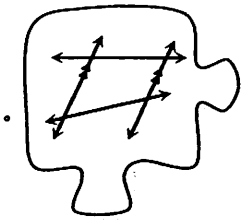
(5)



(6)



2.1.2 What is the relationship?

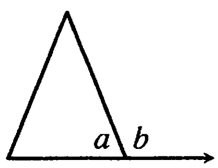


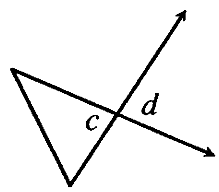
Angles Formed by Transversals

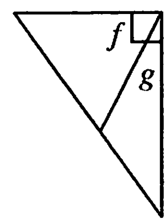
In Lesson 2.1.1, you examined vertical angles and found that vertical angles are always equal. Today you will look at another special relationship that guarantees angles have equal measure.

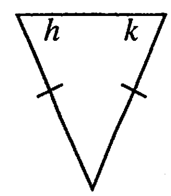
2-13. Examine the diagrams below. For each pair of angles marked on the diagram, quickly decide what relationship their measures have. Your responses should be limited to one of three relationships: same (equal measures), complementary (have a sum of 90°), and supplementary (have a sum of 180°).

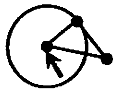
a. **[Supplementary]** b. **[Same]** c. **[Complementary]** d. **[Same]**





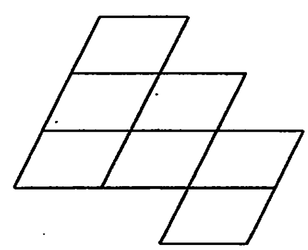




2-14. 

Marcos was walking home after school thinking about special angle relationships when he happened to notice a pattern of parallelogram tiles on the wall of a building. Marcos saw lots of special angle relationships in this pattern, so he decided to copy the pattern into his notebook.

The beginning of Marcos's diagram is shown at right and provided on the Lesson 2.1.2 Resource Page. This type of pattern is sometimes called a **tiling**. In this tiling, a parallelogram is copied and translated to fill an entire page without gaps or overlaps.

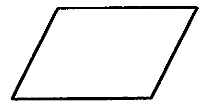


a. Since each parallelogram is a translation of another, what can be stated about the angles in the rest of Marcos' tiling? Use a dynamic geometry tool or tracing paper to determine which angles must have the same measure. Color all angles that must be equal the same color.
[The end result only requires two colors.]

Problem continues on next page →

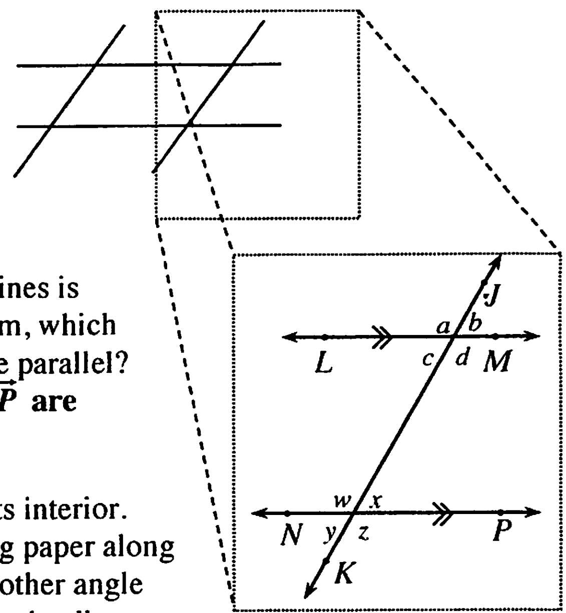
2-14. *Problem continued from previous page.*

b. Consider the angles inside a single parallelogram. Which angles must have equal measure? How can you justify your claim? **[Opposite angles must be equal because translation preserves angle and vertical angles have equal measure.]**



c. What about relationships between lines? Can you identify any lines that must be parallel? Mark all the lines on your diagram with the same number of arrows to show which lines are parallel. **[Opposite sides of a parallelogram are parallel because of the definition of parallelogram (from Lesson 1.3.2).]**

2-15. Julia wants to learn more about the angles in Marcos's diagram and has decided to focus on just a part of his tiling. An enlarged view of that section is shown in the image below right, with some points and angles labeled.



a. A line that crosses two or more other lines is called a **transversal**. In Julia's diagram, which line is the transversal? Which lines are parallel? **[$\overleftrightarrow{JK}$ is the transversal; $\overleftrightarrow{LM}$ and $\overleftrightarrow{NP}$ are parallel.]**

b. Trace $\angle x$ on tracing paper and shade its interior. Then translate $\angle x$ by sliding the tracing paper along the transversal until it lies on top of another angle and matches it exactly. Which angle in the diagram corresponds with $\angle x$? **[$\angle b$]**

c. In this diagram, $\angle x$ and $\angle b$ are called **corresponding angles** because they are in the same position at two different intersections of the transversal. What is the relationship between the measures of angles x and b? Must one be greater than the other, or must they be equal? Explain how you know. **[They are equal, because they were copied from the same angle of the original parallelogram. As learned in Chapter 1, translations are rigid transformations, so they preserve both length and angle.]**

Dilation