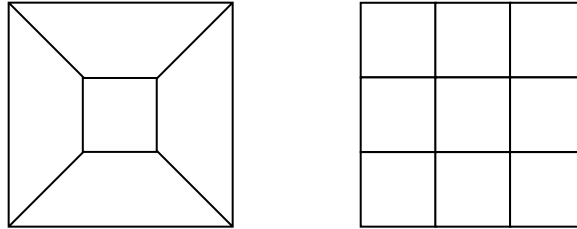


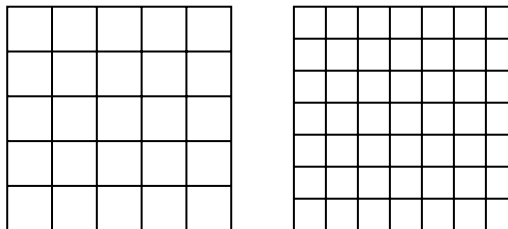
EXPLORATION 9.13 **Quilts and Proportions****PART 1: The Spool**

The quilt block on the left below is called the Spool. Quilters say the Spool is a *9-patch pattern* because it can be made from 9 *patches*, or 9 smaller squares, as shown at the right below.

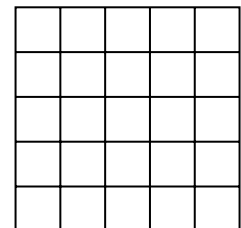


Having examined close to 100 quilt books and many quilts in person, I know that, not surprisingly, there have been many variations of standard quilt patterns over the years. In other words, quilters have played the “what-if” game. Let us play one round here.

1. What if we made a version of the Spool pattern but used a 5-patch design or a 7-patch design? See the grids representing various patch layouts below. (You’ll notice the inconsistency in quilting terminology: The 9 in “9-patch” refers to the number of little squares, but the 5 in “5-patch” refers to the dimensions of the square; that is, it is a 5 by 5 square.) How would the appearance of a 5-patch Spool differ from the 9-patch Spool shown above?
 - a. Describe your thoughts.
 - b. Compare your descriptions with those of your partner(s).

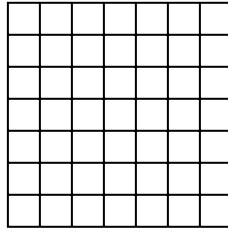


2. Now make a 5-patch version of the Spool that has the same size block.



⁴Marjorie Senechal, *On the Shoulders of Giants*, p. 155.

- a. Compare the lengths of the sides of the squares in the middle and the surrounding trapezoids.
 - b. Compare the areas of the squares in the middle and the surrounding trapezoids.
3. Now make a 7-patch Spool. Before calculating, predict the ratio of sides and areas for the 9-patch, 5-patch, and 7-patch versions of the Spool. Explain your reasoning.

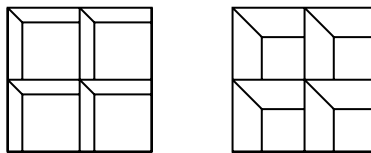


Looking Back

What did you learn from this exploration?

PART 2: Attic Windows

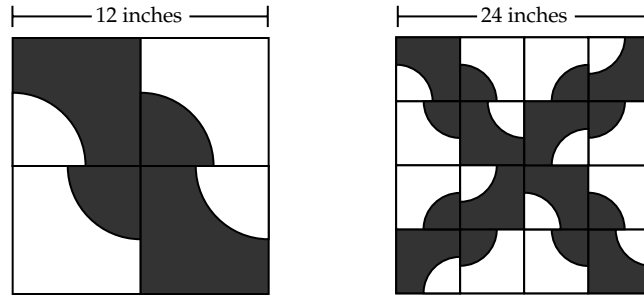
Here are two variations of another famous quilting pattern called Attic Windows.



1. How can we use the idea of patches to construct the Attic Windows pattern? Make some different Attic Windows patterns and “play” with them. Describe your observations and discoveries.
2. Write directions for making an Attic Windows pattern as if you were sending it by E-mail, where you could use only words.

PART 3: Drunkard’s Path

Another famous quilting pattern is called the Drunkard’s Path.

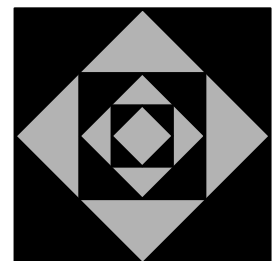


Before we examine the Drunkard's Path block and variations, let us analyze the pattern itself. Like many other patterns, this one has many variations. The figure on the left represents one block. The figure on the right shows four blocks put together to make the desired pattern. There are many different ways to put together the basic block, and some of these different ways have names of their own: Fool's Puzzle, Falling Timbers, Wonder of the World, and Lone Ring.

1. Describe what you see. Assume that a friend missed class today but has the pattern at the left. Write down what you will say on the telephone to help your friend make the design at the right.
2. Experiment with Drunkard's Path blocks whose individual patterns have different proportions. Which do you like best? Why?
3. Play with different patterns that can be made with multiple copies of the basic Drunkard's Path. Submit your favorite one, and explain why you like it. Give it a name.

PART 4: Squares inside squares

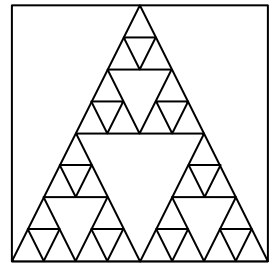
1. Make a larger copy of the quilt block at the right. You can choose the dimensions of the block.
2. Determine the ratios of the lengths of the sides of the 6 squares in the block and the ratios of the areas of the 6 squares.



3. If you were to use this color scheme (that is, dark and light), how much of each color would you need if each block was 9 inches by 9 inches and the quilt consisted of 72 blocks — that is, if it were 81 inches by 81 inches?

PART 5: Triangles inside triangles

1. Make the quilt block at the right, and describe how you made it. You can choose the dimensions of the block.
2. Determine the ratios of the sides of the different-sized triangles that are similar.
3. Determine the ratios of the areas of the different triangles that are similar.
4. Shade in the quilt according to various schemes from Pascal's triangle.



PART 6: Stars and Squares

1. Describe what you see. Compare descriptions with those of your partner(s).
2. Make the quilt block, and describe how you made it. You can choose the dimensions of the block.
3. Observe the figure as long as you wish, then draw the figure from memory. Then describe your thinking process.
4. Is the star in the center of the figure mathematically similar to the large star? Why or why not?
5. Let us compare the areas of the two stars. At the most basic level, we can say that the big star is much bigger than the little star in the middle. How much bigger is the bigger star?
 - a. Without doing any measuring or computation on paper or with a calculator, describe your thoughts. Explain your thinking.
 - b. Compute and compare the areas of the two figures.
 - c. If we made a littler star inside the little star, what would its area be?

