Name Date

Enrichment and Extension

10.1

Counting Jasmine’s Rectangular Designs

Jasmine has just been hired to work for a company that designs patios and walkways. Her first assignment is to make pictures of walkway and patio designs that can be made with their new decorative square stones. She needs to make one picture for each of the possible rectangles that can be made with 30 to 40 stones. Jasmine decides to put each rectangular design on a separate card. (*Note:* A rectangle that is 5 stones wide and 6 stones long is the same as one that is 6 stones wide and 5 stones long.)

1. How many cards will Jasmine have to make? List the dimensions of all the different rectangles that can be made with 30 to 40 stones.

2. Jasmine dropped her cards and one of them was ruined.

a. Is it more likely that the ruined card has an odd or even number of square stones in the design? Explain your reasoning.

b. Is it more likely that the ruined card has more or less than 35 square stones in the design? Explain your reasoning.

3. A customer wants to buy the number of blocks between 30 and 40 that will give her the most options for a rectangular patio or walkway. How many should she buy? Explain your reasoning.

4. Another customer wants to make a rectangular walkway that is between   
2 and 5 blocks wide. He’s not sure how long he wants to make it, but he wants to buy some blocks to set out in the space in order to visualize his options before making his decision. He wants to have at least 30 stones and at least six options to consider. What is the least number of blocks that he should buy? Explain your reasoning.

5. The side length of the square stones is 9 inches. A customer wants to make a patio that is 3 feet 3 inches by 5 feet 9 inches. The stones can be cut in halves, quarters, or thirds.

a. Draw a picture showing how many full and partial squares he will need to make the patio.

b. How many stones will he need to buy in order to have the least waste?

c. How many stones will he need to have cut and to what sizes? How many stone pieces will he have left over, and what sizes will they be?