

Patio Problem

Patricia is building square patios with dark-colored tiles and surrounding them with borders of a single layer of light-colored tiles.

- a. What is the smallest patio she can build? Use square tiles to build this patio and its border.
- b. What is the next larger patio she can build? Build this patio and its border.
- c. What is the third larger patio she can build? Build this patio and its border.
- d. How do you know there are no patios in between the three you have built?
- e. Use square tiles to build the fourth and fifth patios in the pattern. What patterns do you see in the tiles?
- f. Make a table listing the patio number, the number of dark patio tiles, the number of light border tiles, and the total number of tiles for the first five patios. What patterns do you see in the table?
- g. How are the patterns in the table related to the patterns in the tiles?
- h. Determine the values in the table for the n th patio. What rules can you find for predicting these values? How did you determine these rules?
- i. How many different ways can you visualize the number of border tiles in the n th patio? Write as many different expressions as you can. For each expression, describe how it shows the number of border tiles needed.