

## *Exploring Squares and Square Roots*

Students use square tiles and grid paper to explore the concept of square roots.

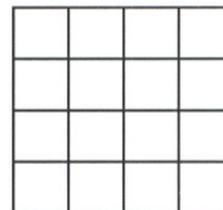
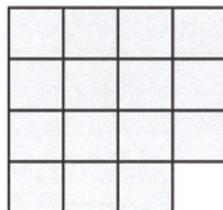
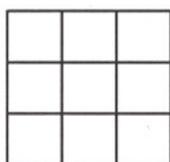
- Activity 1: Students are asked to find the square root of 9. They take 9 square tiles and try to build a square using all the tiles. The square created is a  $3 \times 3$  square; therefore, the principle square root of 9 is 3.



Repeat this process for 4 tiles, 16 tiles, and 25 tiles.

Repeat this process using grid paper for 36 tiles, 49 tiles, and 81 tiles.

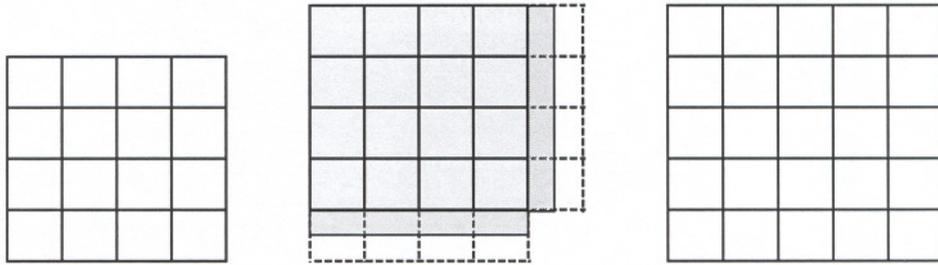
- Activity 2: Students are asked to find the square root of 15. They take 15 square tiles and try to build a square using all the tiles. There are not enough tiles to build a  $4 \times 4$  square and too many for a  $3 \times 3$  square; therefore, the square root of 15 is between 3 and 4. Students go ahead and build the  $3 \times 3$  square and then use the 6 remaining tiles to create a shape as close to a square as possible. Placing 3 tiles along the length and 3 tiles along the width creates a shape which is only 1 tile short of a  $4 \times 4$  square; therefore, the square root of 15 is almost 4.



Repeat this process for 5 tiles, 8 tiles, and 14 tiles.

Repeat this process using grid paper for 20 tiles, 30 tiles, and 44 tiles.

Activity 3: Students are asked to find the square root of 20. They take 20 tiles and try to build a square using all the tiles. There are not enough tiles to build a  $5 \times 5$  square and too many for a  $4 \times 4$  square; therefore, the square root of 20 is between 4 and 5. Have students build the  $4 \times 4$  square and record it on grid paper. Have them imagine taking the remaining 4 tiles and cutting them in half. On the grid paper, have them add one-half tiles along the length and one-half tiles along the width. This creates a shape which is only one-fourth tile short of a  $4.5 \times 4.5$  square; therefore, the square root of 20 is almost 4.5.



Repeat this process for 3 tiles, 11 tiles, and 18 tiles.

Repeat this process using grid paper for 24 tiles, 32 tiles, and 60 tiles.