**Rates of Change-Part 1**

**Materials needed:**  25 (or 36) wooden blocks

Directions:

1. Take 9 blocks and form a 3 by 3 square.
2. How many blocks lie on the perimeter of the figure? Record that number in the table.

|  |  |
| --- | --- |
| Number of blocks on the side of the square. | Number of blocks on its perimeter |
|  |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
|  |  |

1. Take 16 blocks and form a 4 by 4 square. How many blocks lie on its perimeter? Record that number in the table.
2. Take 25 blocks and form a 5 by 5 square. How many blocks lie on its perimeter? Record that number in the table.
3. Take 36 blocks and form a 6 by 6 square. How many blocks lie on its perimeter? Record that number in the table.
4. Try to determine a pattern to your data and fill in the values for squares of side 2 and side 7.
5. Make a scatterplot of this data on Desmos. Let x represent the number of blocks on the side of a square and y represent the number of blocks on its perimeter. Copy the scatterplot onto graph paper. Be sure to label your axes with a scale and a description of the variable.
6. Determine the successive differences between the values in the second column and write them at the top of the next page. What do you notice about these differences?

|  |
| --- |
| Difference between entry values |
|  |
|  |
|  |
|  |
|  |

1. Write an equation that describes the pattern you determined in step 6 in terms of x and y. Graph the equation on Desmos and on your scatterplot. Does it go through your data?
2. In terms of the number of blocks, what is the meaning of the number you computed for the slope of the function.
3. For what value of x is y = 0. What does that mean in terms of the context of the problem?
4. Use your equation to predict how many squares would be in the perimeter of a square that is 12 by 12.
5. Use your equation to predict the size of a square given that there were 56 squares in the perimeter of the square.