
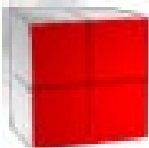
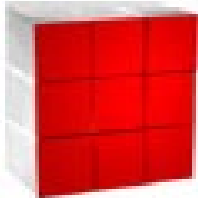



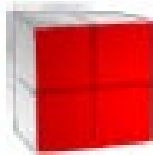
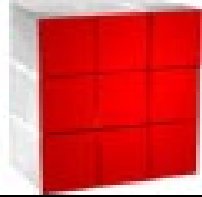
Nonlinear relationships
Block 2 Student Activity Sheet

1. Complete this table to show that you understand the relationship between the height of any square array and the number of painted cube faces it has.

| Height in cubes | Visual description | Written description | Process | Number of faces painted |
|-----------------|---|------------------------------------|------------------------------|-------------------------|
| 1 |  | A 1-by-1 array has 1 painted face. | $1 \cdot 1 = 1$ $1^2 = 1$ | 1 |
| 2 |  | | | 4 |
| 3 |  | | | |

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2. Continue your work on the table showing the relationship between the height of a square array and the number of square faces it has.
- a. Complete the table for arrays with heights of 4 and 5 cubes.

| Height in cubes | Visual description | Written description | Process | Number of faces painted |
|-----------------|--|-------------------------------------|------------------------------|-------------------------|
| 1 |  | A 1-by-1 array has 1 painted face. | $1 \cdot 1 = 1$ or $1^2 = 1$ | 1 |
| 2 |  | A 2-by-2 array has 4 painted faces. | $2 \cdot 2 = 4$ or $2^2 = 4$ | 4 |
| 3 |  | A 3-by-3 array has 9 painted faces. | $3 \cdot 3 = 9$ or $3^2 = 9$ | 9 |
| 4 | | | | |
| 5 | | | | |

- b. Is the relationship between the number of square faces painted and the height of the array a function? How do you know?
- c. Build a function rule that expresses the relationship between the height of the square array (n) and the number of cube faces (f) you will paint.

| | | | |
|-------|------|-----|-----|
| n^2 | $2n$ | n | f |
|-------|------|-----|-----|

An n by n square array has faces to paint. Therefore, the function rule is = .

3. Is there a constant addition pattern in this data? Explain your answer.

Nonlinear relationships

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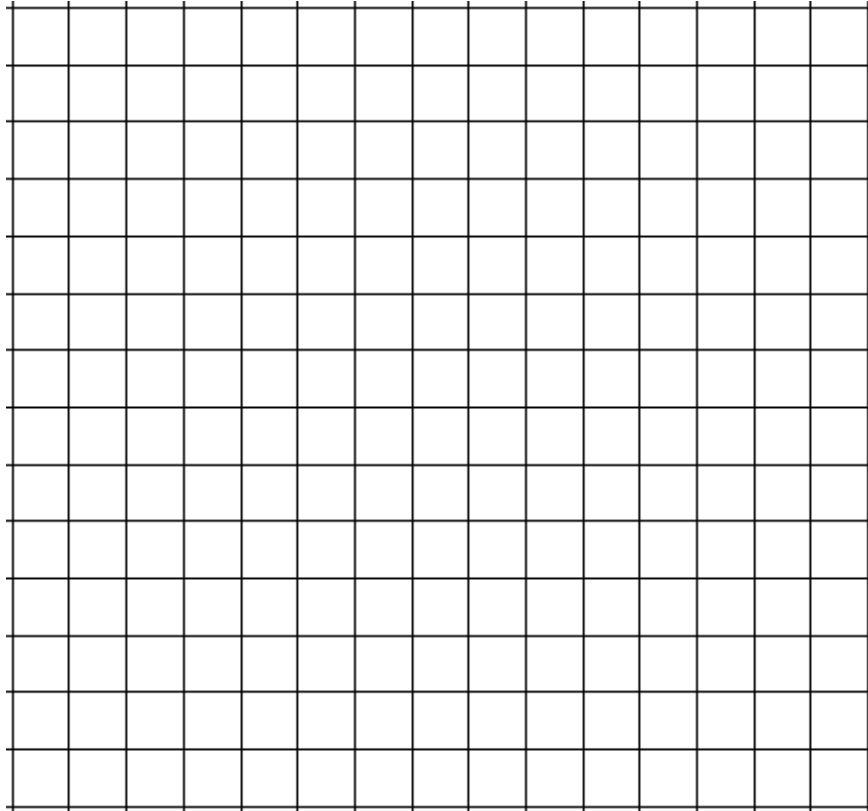
4. How does the function rule you developed for these data compare with the function rules you found for linear data sets?
5. Think about reasonable input and output values for the cube array situation.
- a. What are reasonable input values for this situation? Justify your answer.

 - b. What are reasonable output values for this situation? Justify your answer.

Nonlinear relationships

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6. Graph the data from your table on graph paper.

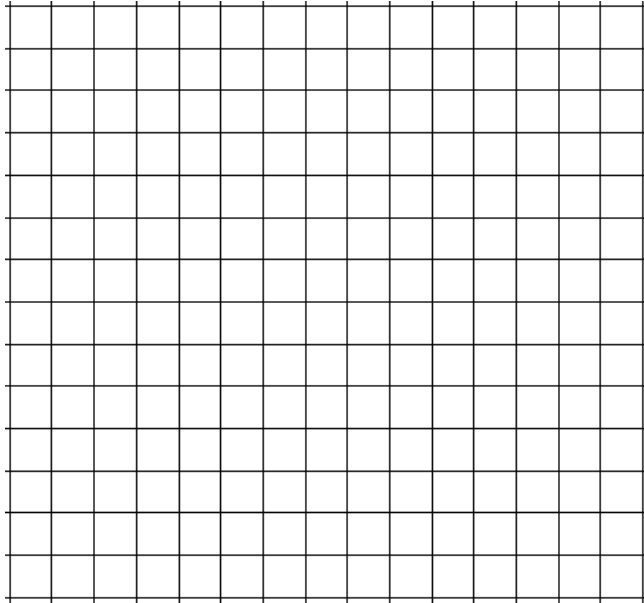


7. What does x represent in this problem situation? What does y represent in this problem situation?

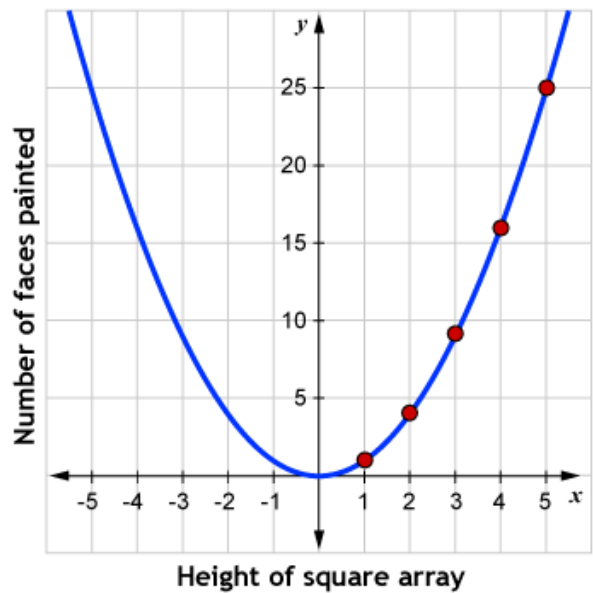
Nonlinear relationships

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8. Now use your calculator to make a scatterplot of the data from your table. Then use your calculator to graph the function rule you developed in question 2 over your scatterplot. How does the graph of the function rule compare with your scatterplot?



9. A graph with this shape is called a _____ . The data relationship (or function) that creates a parabola is called a _____ .



Nonlinear relationships

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10. **REINFORCE** Consider the following pattern. Write a function rule and create a graph to represent the relationship between the figure number and the total number of squares in each figure.

