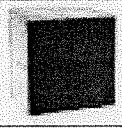
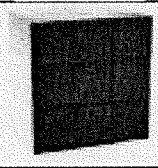
Student:_____ Class:_____ Date_____

## Understanding inverse relations

Student Activity Sheet 4; *Exploring* "The quadratic function and its inverse" 

1. Study the given relationship between the height of the square array (***n***) and the number of painted faces (***f***). Then, complete the table.

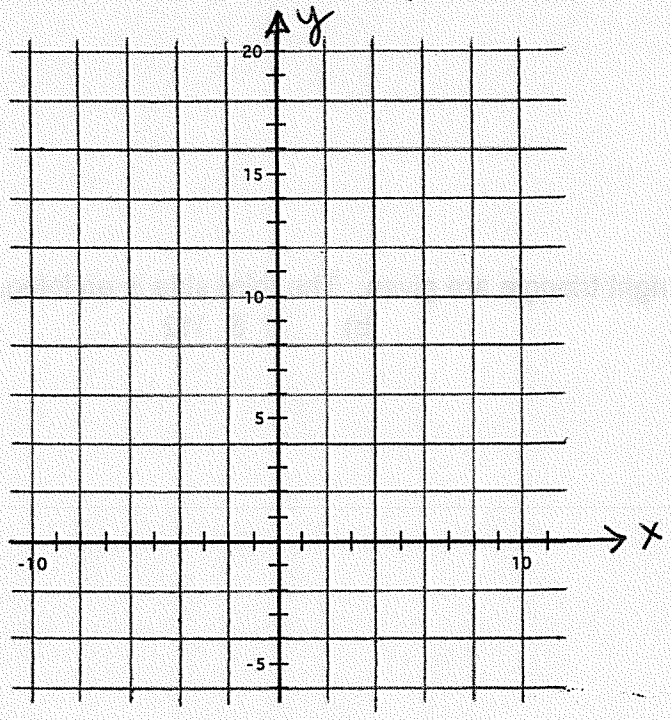
| Height in cubes | Visual description | Written description | Process | Number of faces painted |
|---|---|---|---|---|
| 1 |  | A 1-by-1 array has 1 painted face. | $1 \cdot 1 = 1$ or $1^2 = 1$ | 1 |
| 2 |  | A 2-by-2 array has 4 painted faces. | $2 \cdot 2 = 4$ or $2^2 = 4$ | 4 |
| 3 |  | A 3-by-3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

2. What type of function models the situation in question 1? How do you know?

3. **REINFORCE** Could a quadratic function model the data in the table below? Justify your answer.

| ***x*** | ***y*** |
|---|---|
| -2 | 5 |
| -1 | 0 |
| 0 | -1 |
| 1 | 2 |
| 2 | 9 |

4. Make a scatterplot that represents the data from the problem situation. Then sketch a complete graph of the function rule that models the problem situation.




5. What name is given to the curve that is the graph of the function rule?

6. Compare the domain and range of the function rule to the domain and range of the problem situation.

7. Complete the table of the inverse relationship by treating the number of cube faces painted as the independent variable and the height of the array as the dependent variable.

| Number of faces painted | Height in cubes |
|---|---|
| 1 | |
| 4 | |
| 9 | |
| 16 | |
| 25 | |
| 36 | |
| 49 | |
| *n* | |

8. Complete the table to show the inverse of the problem situation. Then graph the inverse relationship and both function rules.

| $x$ | $y = x^2$ |
|---|---|
| 1 | 1 |
| 2 | 4 |
| 3 | 9 |
| 4 | 16 |

| $x = y^2$ | $y$ |
|---|---|
| | |
| | |
| | |
| | |