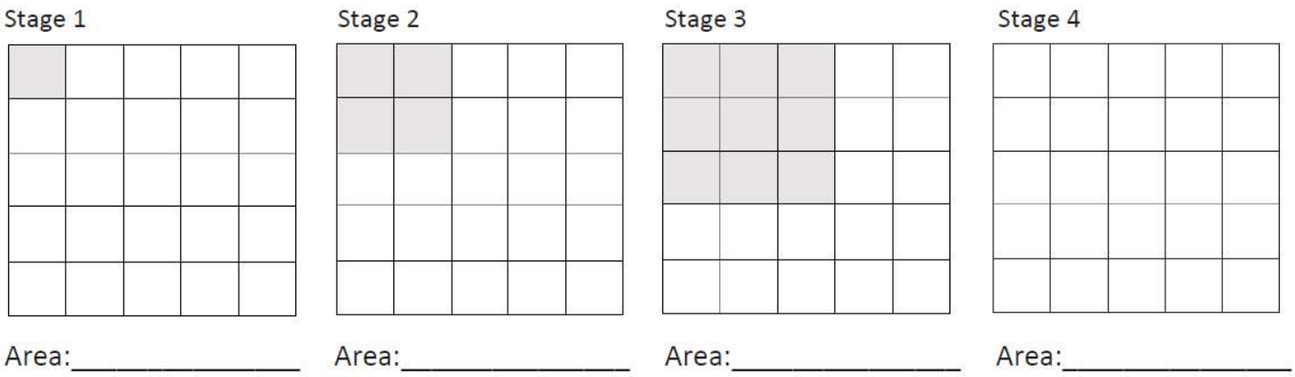
1.2 Quadratic Functions

Part I: Picturing Parabolas

1. Jared is tiling his kitchen floor with 1 foot square tiles. He starts in one corner and progresses as shown in the diagram below. Shade the fourth stage, then calculate the area of floor covered at each stage.



2. This function is an example of a quadratic function. The graph of a quadratic function is called a parabola, but to view the entire parabola we must expand the domain to include negative values.

Part II: Characteristics of Parabolas

3. When graphing parabolas, it is important to look for key features like intercepts, domain, range, and maximum or minimum values. For example, for the function $f(x) = x^2$, complete the table, sketch a graph, and determine the following characteristics.
4. What is the x-intercept?
5. What is the y-intercept?
6. What is the domain of f(x)?
7. What is the range of f(x)?
8. Over what interval is the graph increasing?
9. Over what interval is the graph decreasing?
10. What are the coordinates of the minimum point?
11. Parabolas always have either a maximum point or a minimum point. This point is called the ***vertex*** of the graph. When graphing parabolas, it is often important to identify the vertex. Find the vertex of f(x).
12. As the x-values approach very large positive numbers, explain what happens to the output values of $f(x) = x^2$ (i.e. describe the end behavior).
13. Describe the end behavior for the function $f(x)= x^2$ as the magnitude of x gets very large in the negative direction.