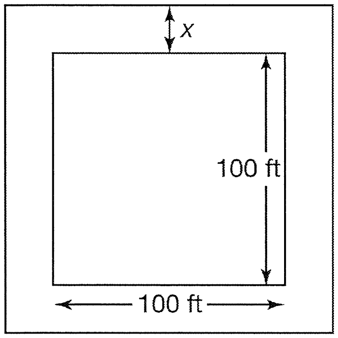
Name ____________________ Date __________

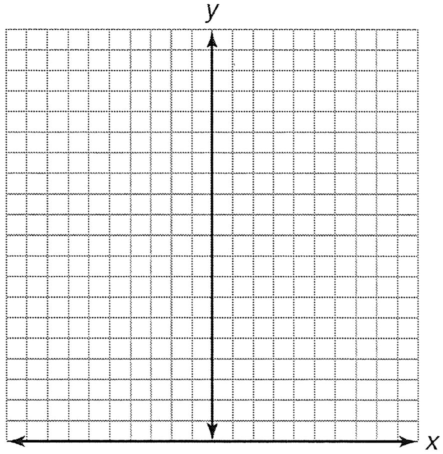
More Than Meets the Eye
Transformations of Quadratic Functions

1. The owners of a botanical park would like to create a walkway around one of their premier gardens. The garden is 100 feet long and 100 feet wide. The drawing below shows the layout of the garden and walkway.



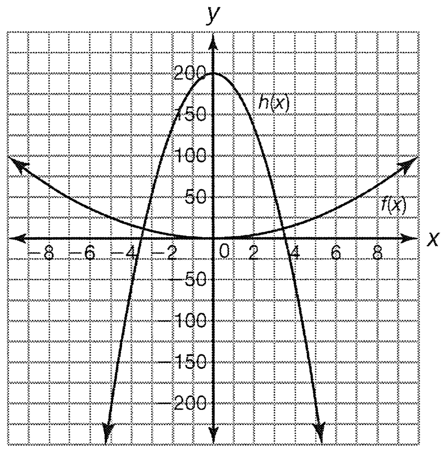
a. Determine the function, $A(x)$, that represents the total area of the garden and walkway, Let x represent the width of the walkway. Then, write the quadratic function in vertex form.

b. Graph the function with the bounds [−80, 80] X [−10, 1000], with an X-scale of 10 and a Y-scale of 100. Sketch the graph on the coordinate plane provided. Also sketch the graph of the basic function $f(x) = x^2$ on the same coordinate plane. Label the graphs.



c. Describe how the graph of $A(x)$ compares to the graph of $f(x)$ and define the types of transformations the changes represent.

2. A physics class has been assigned the task of creating a container that will protect an egg that their teacher will drop from the roof of their school. The graph below shows the basic function $f(x) = x^2$, and also shows the function $h(x)$ which represents the height of the egg with respect to x, the time it is in the air.



a. Describe the types of transformations performed on $f(x)$ to result in $h(x)$.

b. If the dilation factor is 16, write the function $h(x)$ that represents the height of the egg.

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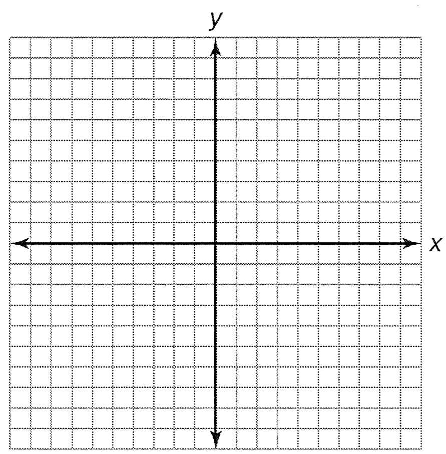
3. A company's revenues are dependent on the amount of product they sell, x. Use the given characteristics to write a function $R(x)$ in vertex form, which represents the company's revenue with respect to x. Then, sketch the graph of $R(x)$ and the basic function $f(x) = x^2$ on the grid.

- The function is quadratic.
- The function is continuous.
- The function has an absolute maximum.
- The function is translated 70 units up and 100 units to the right from $f(x) = -\frac{1}{5}x^2$.
- The function is vertically stretched with a dilation factor of $\frac{1}{5}$.

Equation: $R(x) =$



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