2. Describe each graph in relation to its basic function.

a. Compare $f(x) = ax^2$ when $a > 1$ to the basic function $g(x) = x^2$.

b. Compare $f(x) = ax^2$ when $0 < a < 1$ to the basic function $g(x) = x^2$.

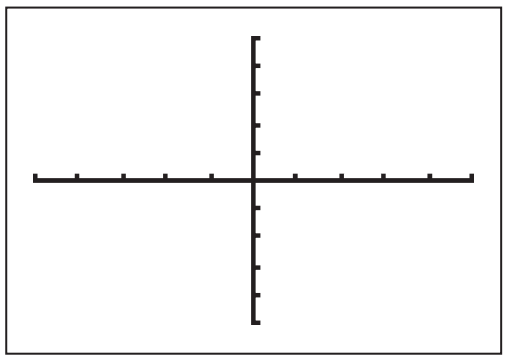
PROBLEM 3 Name That Parabola

1. Use the given characteristics to write a function and sketch a graph of $f(x)$.

a. Write a function in vertex form and sketch a graph that has these characteristics:

- The function is quadratic.
- The function is continuous.
- The parabola opens upward.
- The function is translated 5 units to the right of $f(x) = x^2$.

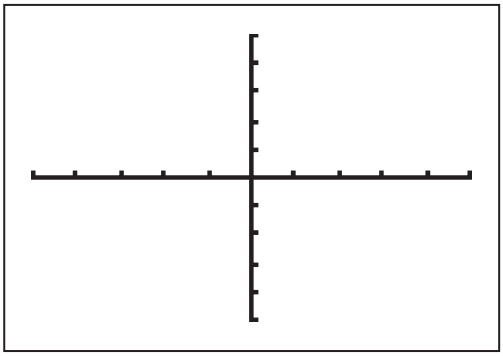
Equation: $f(x) =$ _____



b. Write a function in vertex form and sketch a graph that has these characteristics:

- The function is quadratic.
- The function is continuous.
- The parabola opens downward.
- The function is translated 1 unit down from $f(x) = -x^2$ and is vertically dilated with a dilation factor of 2.

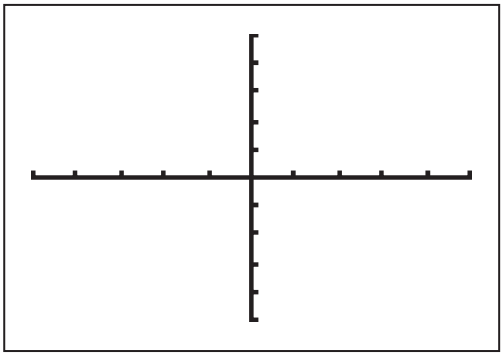
Equation: $f(x) =$ _____



c. Write a function in vertex form and sketch a graph that has these characteristics:

- The function is quadratic.
- The function is continuous.
- The parabola opens upward.
- The function is translated 4 units down and 3 units to the left of $f(x) = x^2$.
- The function is vertically dilated with a dilation factor of $\frac{1}{4}$.

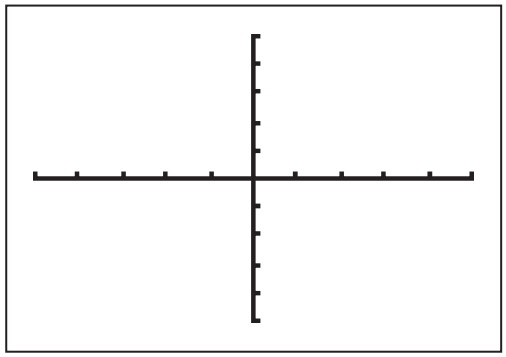
Equation: $f(x) =$ _____



d. Write a function in vertex form and sketch a graph that has these characteristics:

- The function is quadratic.
- The function is continuous.
- The parabola opens downward.
- The function is translated 8 units up and 2 units to the right of $f(x) = x^2$.

Equation: $f(x) =$ _____



2. Based on the equation of each function, describe how the graph of each function compares to the graph of $g(x) = x^2$.

a. $w(x) = (x + 2)^2$

b. $t(x) = 3x^2 + 4$

c. $z(x) = -(x - 1)^2 - 10$

d. $r(x) = \frac{1}{2}(x + 6)^2 + 7$

Be prepared to share your solutions and methods.