

# Assignment

## Write

Write the transformation form for a function  $f(x)$ . Then, in your own words, describe how each of the values  $A$  and  $D$  affects the graph of the function.

## Remember

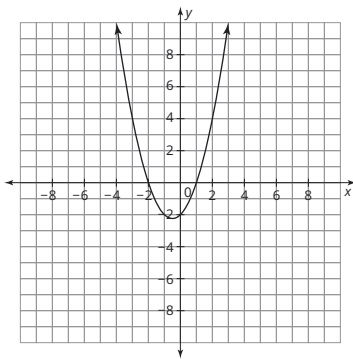
Functions can be translated and dilated by non-constant values, which apply a different transformation to each point of the function.

## Practice

Dilate each function to create a new function of higher degree. Sketch the graph and then identify the zeros of each new function.

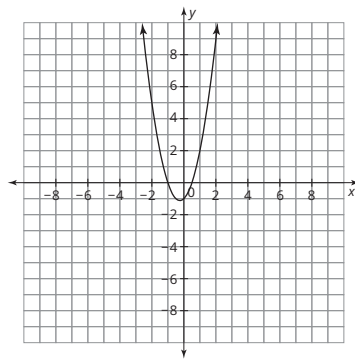
1.  $f(x) = (x + 2)(x - 1)$

Dilate the function by  $x$ .



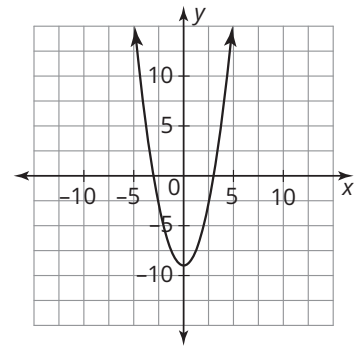
2.  $g(x) = (x + 1)(2x - 1)$

Dilate the function by  $x - 1$ .



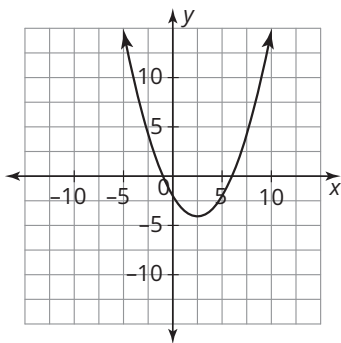
3.  $h(x) = (x + 3)(x - 3)$

Dilate the function by  $(x + \frac{1}{2})$ .



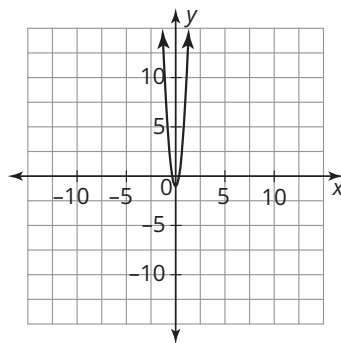
4.  $m(x) = (\frac{1}{3}x - 2)(x + 1)$

Dilate the function by  $x$ .



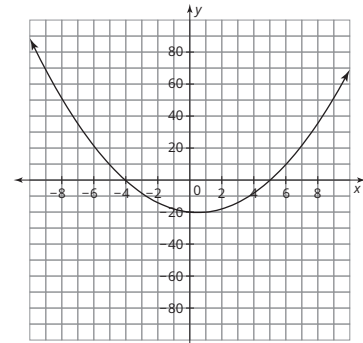
5.  $f(x) = (3x - 1)(3x + 1)$

Dilate the function by  $x - 2$ .



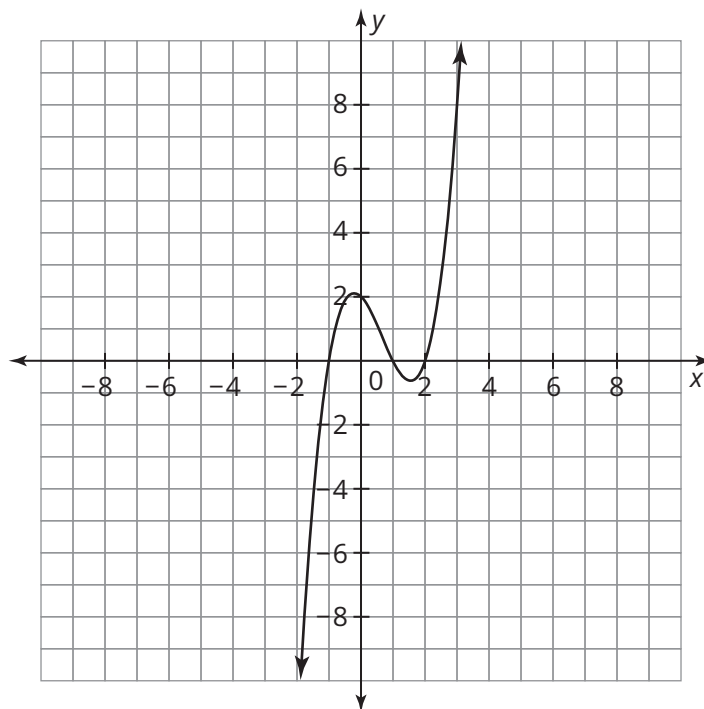
6.  $g(x) = (x + 4)(x - 5)$

Dilate the function by  $x + 3$ .

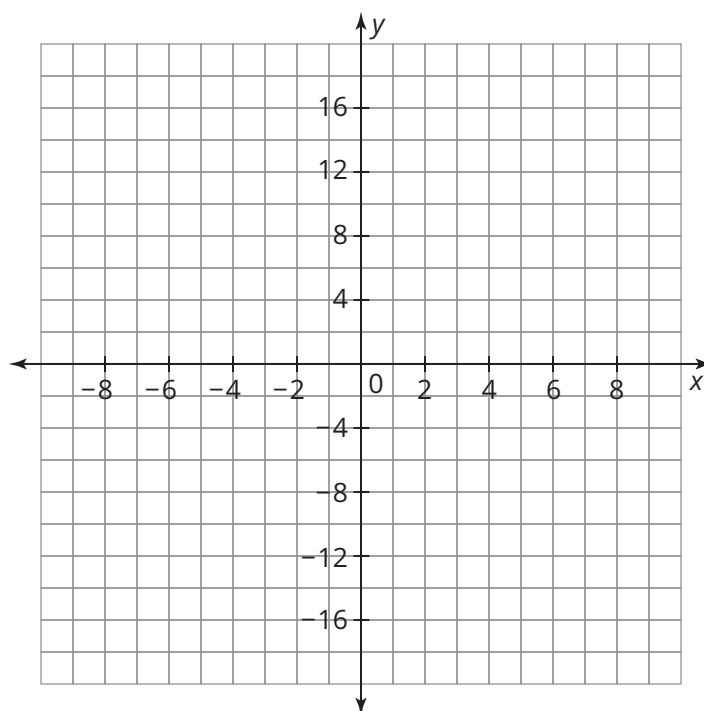


## Stretch

1. Consider the graph of a cubic function.
  - a. Determine a quadratic function that could have been dilated to produce the cubic function. State the function used to dilate the quadratic function.
  - b. Determine a linear function that could have been dilated to produce the cubic function. State the function used to dilate the linear function.



2. Consider the function  $f(x) = x^3 + 2x^2 - 5x - 6$ .
  - a. Use technology to graph the function, and then sketch it on the grid.
  - b. Determine the domain and range of the function.
  - c. Determine the intervals over which the function is increasing and decreasing.
  - d. Determine the x- and y-intercepts of the graph of  $f(x)$ .
  - e. Determine the values of  $x$  for which  $f(x) = -4$ .



## Review

1. Alton is making a sandbox for his kids in the backyard. He has 400 feet of board for the sides of the sandbox.
  - a. Define the function  $A(w)$  to represent the area of the sandbox as a function of the width. Explain your reasoning.
  - b. Determine the maximum area of the sandbox as well as the length and width that will result in the maximum area. Explain your reasoning.
2. Quinna is saving money for a new bike. She has \$5.00 in her savings account as of January 1. At the end of each month starting with January 31, she is planning to add to her account an amount that is equal to the amount in the account.
  - a. Determine a method to calculate the amount she adds each month. Use that method to calculate the amount of money added for each of the first 5 months.
  - b. Quinna needs \$400 to purchase the new bike. At the end of which month will she have enough money? Explain your reasoning.
3. Rewrite  $y = 2(x - 1)^2 - 9$  in general form.
4. Rewrite  $y = 5x^2 - x - 18$  in factored form.