Assignment

Write

Given a basic function $y = f(x)$ and a function written in transformation form $g(x) = A \cdot f(x-C) + D$, describe how the transformations that are inside a function affect a graph differently than those on the outside of the function.

Remember

The basic absolute value function is $f(x) = |x|$.
The transformed function $y = f(x) + D$ shows a vertical translation of the function.
The transformed function $y = Af(x)$ shows a vertical dilation of the function when $A > 0$ and when $A < 0$ it shows a vertical dilation and reflection across the x-axis.
The transformed function $y = f(x - C)$ shows a horizontal translation of the function.

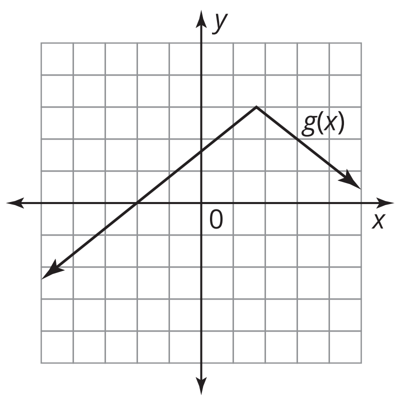
Practice

Given the basic function $f(x) = |x|$. Consider each transformation. Describe how the transformations affected $f(x)$. Then use coordinate notation to describe how each point (x, y) on the graph of $f(x)$ becomes a point on the graph the transformed function. Finally, sketch a graph of each new function.

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

Stretch

The function $g(x)$ shown is a transformation of $f(x) = |x|$.
Write the function $g(x)$ in terms of $f(x)$.



Review

1. The Build-A-Dream construction company has plans for two models of the homes they build, Model A and Model B. The Model A home requires 18 single windows and 3 double windows. The Model B home requires 20 single windows and 5 double windows. A total of 1,800 single windows and 375 double windows have been ordered for the developments.
   a. Write and solve a system of equations to represent this situation. Define your variables.
   b. Interpret the solution of the linear system in terms of the problem situation.

2. A company produces two types of TV stands. Type I has 6 drawers. It requires 3 single drawer pulls and 3 double drawer pulls. The company needs 75 hours of labor to produce the Type I TV stand. Type II has 3 drawers. It requires 6 single drawer pulls. The company needs 50 hours of labor to produce the Type II TV stand. The company only has 600 labor hours available each week, and a total of 60 single drawer pulls available in a week. For each Type I stand produced and sold, the company makes $200 in profit. For each Type II stand produced and sold, the company makes $150 in profit.
   a. Identify the constraints as a system of linear inequalities. Let x represent the number of 6 drawer TV stands produced and let y represent the number of 3 drawer TV stands produced.
   b. Graph the solution set for the system of linear inequalities. Label all points of the intersection of the boundary lines.
   c. Write an equation in standard form for the profit, P, that the company can make.
   d. How many of each type of stand should the company make if they want to maximize their profit? What is the maximum profit?

3. Each function is a transformation of the linear basic function $f(x) = x$. Graph each transformation.
   a. $g(x) = \frac{1}{3}x - 2$
   b. $h(x) = -2x + 1$