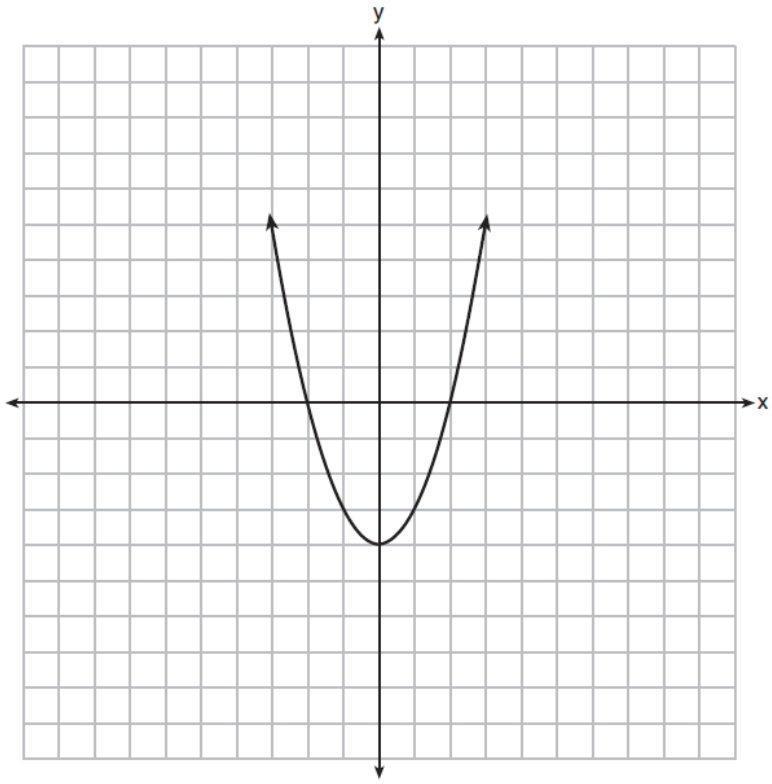
Sample Assessment Problems

From Algebra II/Trig Regents, June 2014

35 The function f(x) is graphed on the set of axes below.

On the same set of axes, graph f(x + 1) + 2.



1. http://www.parcconline.org/sites/parcc/files/PARCC_SampleItems_Mathematics_HSAlgIMathIIMichelleConjecture_081913_Final_0.pdf

Michelle wanted to investigate the effect on the vertex of the graph of $f(x) = x^2 + 6x$ when $f(x)$ is replaced by $f(x + k)$.

Michelle graphed functions of the form $f(x + k)$ for $k = 1, 2, 3$ and 4. For each of the functions she graphed, the *x*-coordinate of the vertex was negative and different for each value of **k**, but the *y*-coordinate of the vertex was the same for each value of **k**. Michelle made three conjectures based on her results.

- The *x*-coordinate of the vertex depends on the value of **k**.
- The *x*-coordinate of the vertex is negative for all values of **k**.
- The *y*-coordinate of the vertex is independent of the value of **k**.

Determine if each of Michelle's three conjectures are true. Justify each answer.

2. Transforming Graphs of Quadratic Functions

http://www.ccsstoolbox.com/parcc/PARCCPrototype_main.html

Part A

Transforming graphs of quadratic functions (high school)

About the task | CCSSM Alignment | **Part a** | Part b | Scoring

The graph of the quadratic function $f(x) = 2(x - 5)^2 + 6$ is shown.

A new function, $p(x)$, is created from the existing function, such that $p(x) = -f(x)$. You may use the coordinate plane and the sliders to show the graph of the new function if you would like. The graph will not be scored.

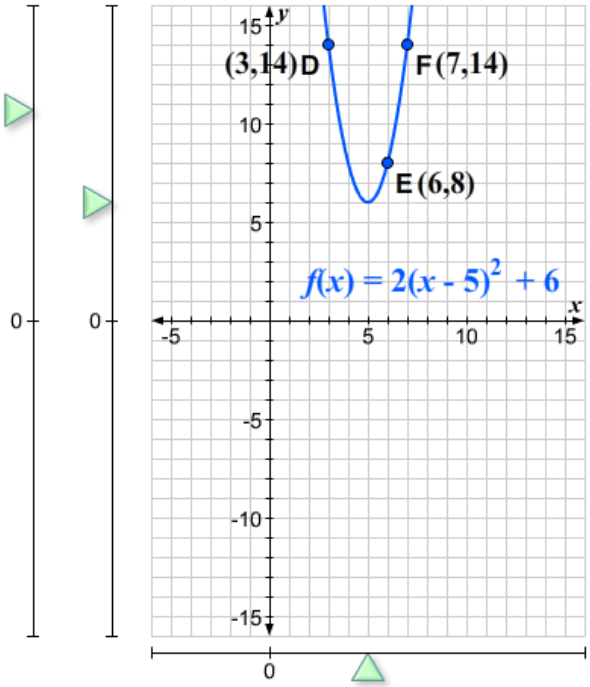
Fill in the blanks to give the coordinates of points **D'**, **E'**, and **F'** that lie on the graph of the new function $p(x)$ and that are the images of points **D**, **E**, and **F** that lie on the graph of $f(x)$.

D'(,)

E'(,)

F'(,)

Submit Answer



Part B

Transforming graphs of quadratic functions (high school)

About the task | CCSSM Alignment | Part a | **Part b** | Scoring

Write your answers to the following problem in your answer booklet.

The graph of the quadratic function $f(x) = 2(x - 5)^2 + 6$ is shown.

The graph of a new function, $g(x)$, is obtained by applying a congruence transformation to the graph of $f(x)$, which takes the points **D**, **E**, and **F** to the points **D'**, **E'**, and **F'**, respectively.

a. Describe a sequence of congruence transformations that gives the graph of the new function $g(x)$.

b. Write an equation for $g(x)$.

c. Compare your equation for $g(x)$ to the equation of the original function, $f(x)$. How do the differences in the equations reveal the transformations you described in part (a)?