MCR3U 1.3 Parabolas in vertex form

We can graph a quadratic function by marking its vertex and following its step pattern if its equation is given in vertex form:

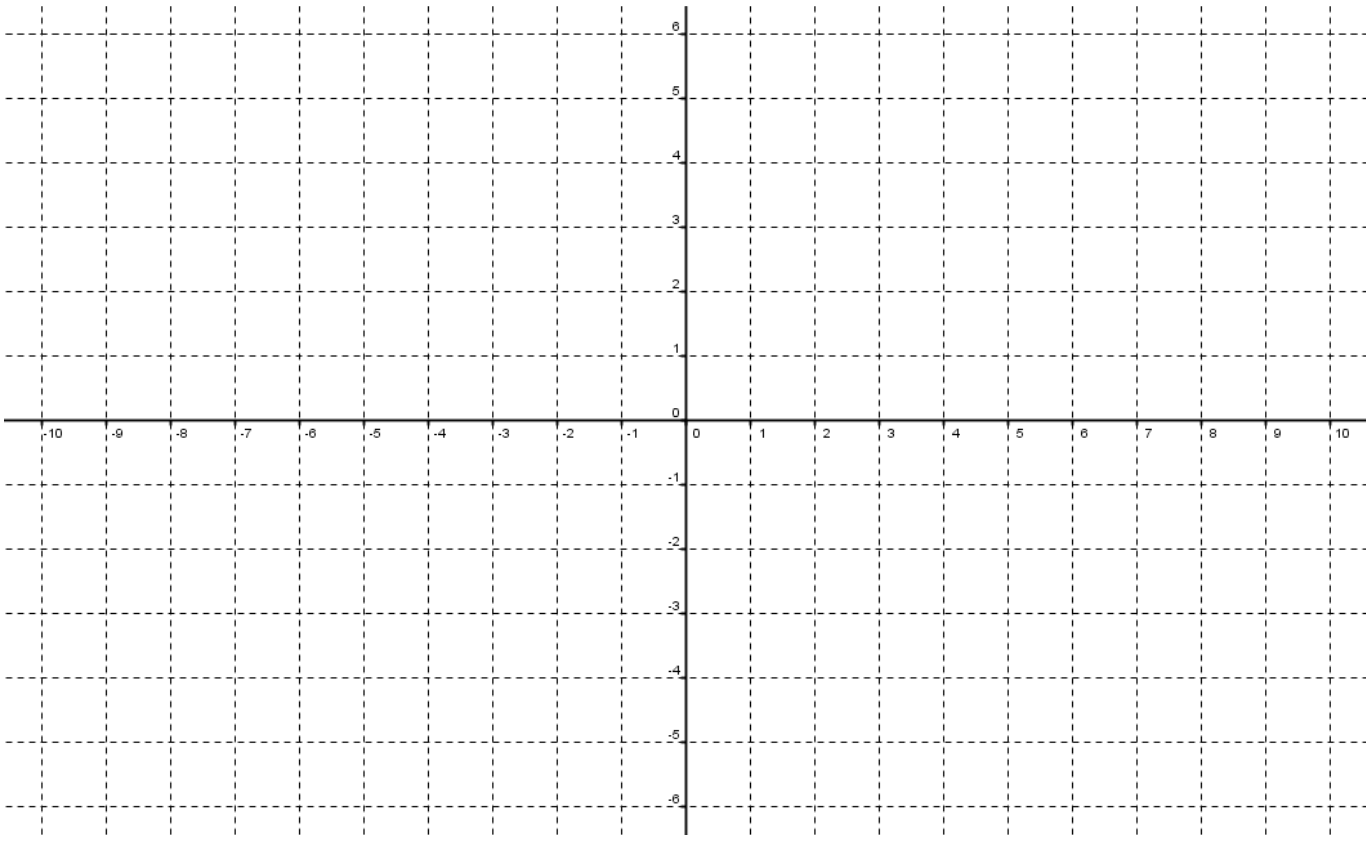
$f(x)=a(x-d)^2+c$ vertex: (d,c)

step pattern: $1,3,5,7\ldots$ multiplied by the value of a
(the "rise" pattern from each point to the next point)

Ex. Graph each of the following parabolas and

- state the range for each parabola
- label the coordinates of each vertex
- state whether each vertex is a maximum or a minimum
- draw and write the equation of each axis of symmetry

a) $f(x)=(x+1)^2-4$ b) $g(x)=2(x-7)^2-5$ c) $f(x)=-3(x+8)^2+6$



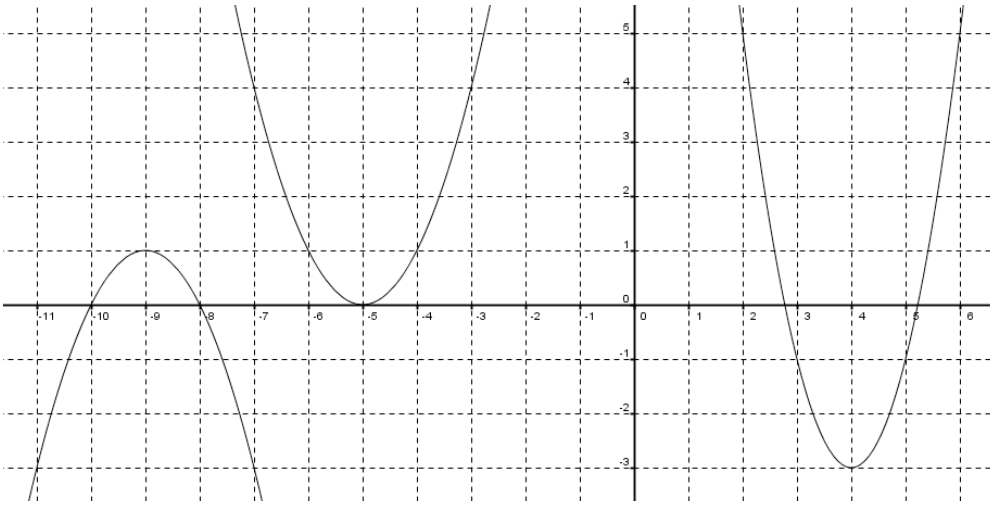
We can write the equation of any quadratic function in either: vertex form or standard form

(These are equivalent if they represent the same function.) $f(x)=a(x-d)^2+c$ $f(x)=ax^2+bx+c$

Ex. Determine an equivalent form for each function (in the previous example) by expanding and simplifying to write them in standard form.

Homework:

1. Determine equations in vertex form and standard form for the quadratic functions graphed below.



2. Graph the following quadratic functions. Label each vertex, step pattern, and axis of symmetry.

a) $f(x)=(x+3)^2+1$ b) $g(x)=2(x-7)^2-6$ c) $h(x)=-3(x+5)^2$