4.1: Graph Quadratic Functions in Standard Form
"I WILL …
Identify, graph and solve a quadratic function using Standard Form."

I. Introduction to Quadratics

A. Write the quadratic in standard form, _____
B. If "*a*" is positive then it opens up, if "*a*" is negative then it opens down.
C. Axis of Symmetry:
D. To find the vertex (turning point) plug the value for *x* into the equation and solve for *y*.
E. The *y*-intercept is _____
F. To find the *x*-intercepts, let $y = 0$, factor or use the Quadratic Formula and solve

II. Definitions

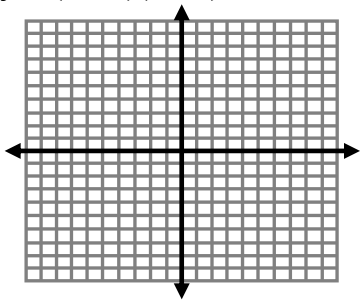
A. How it opens: Does it open up or down?
B. Roots: Where does it cross the x-axis?
C. Y-Intercept: Where does it cross the y-axis?
D. Vertex: The highest/lowest part of the graph
E. Axis of Symmetry: Equation of which the X of the vertex
F. Domain: The set of all x-values.
G. Range: The set of all y-values.
H. Minimum/Maximum: The highest or lowest part of the graph

III. Vertex Form

A. Equation: _____
B. The vertex is _____. Think of _____ _____
C. _____ is the scalar
D. _____ is the Horizontal Translation
E. _____ is the Vertical Translation (also known as 'c')

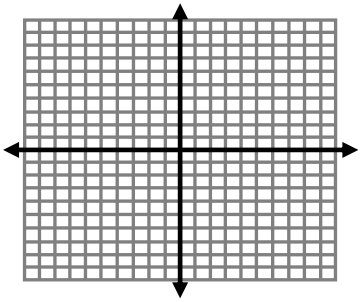
IV. Model Problems

Ex 1:
Graph $y = (x + 3)(x – 3)$ and identify:



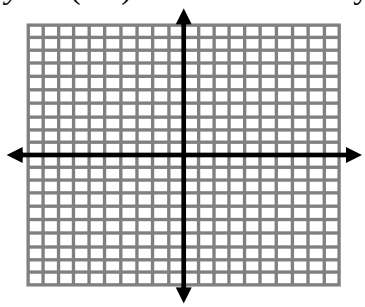
A. **How it opens:** up or down
B. **Roots:** _____
C. ***Y*-Intercept:** _____
D. **Vertex:** _____
E. **Axis of Symmetry:** _____
F. **Domain:** _____
G. **Range:** _____
H. **Minimum/Maximum:** _____

Ex 2:
Graph $y = 4x^2 – 2$ and identify:



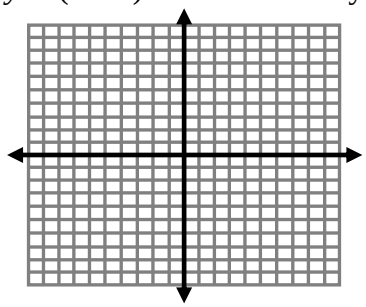
A. How it opens: up or down
B. Roots: _____
C. *Y*-Intercept: _____
D. Vertex: _____
E. Axis of Symmetry: _____
F. Domain: _____
G. Range: _____
H. Minimum/Maximum: _____

Your Turn:
Graph $y = –(1/2)x^2 + 5$ and identify:



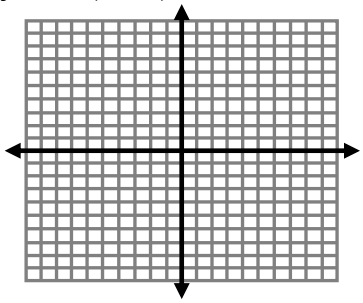
A. How it opens: up or down
B. Roots: _____
C. *Y*-Intercept: _____
D. Vertex: _____
E. Axis of Symmetry: _____
F. Domain: _____
G. Range: _____
H. Minimum/Maximum: _____

Ex 3:
Graph $y = (x + 4)^2 – 9$ and identify:



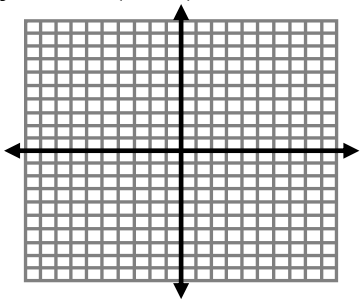
A. How it opens: up or down
B. Roots: _____
C. *Y*-Intercept: _____
D. Vertex: _____
E. Axis of Symmetry: _____
F. Domain: _____
G. Range: _____
H. Minimum/Maximum: _____

Ex 4:
Graph $y = -4(x - 2)^2 + 4$ and identify:



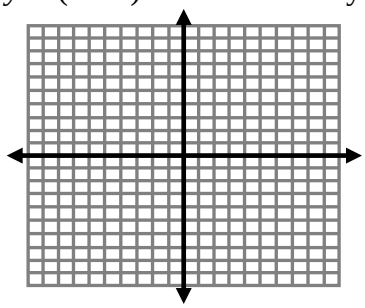
A. How it opens: up or down
B. Roots: _____
C. *Y*-Intercept: _____
D. Vertex: _____
E. Axis of Symmetry: _____
F. Domain: _____
G. Range: _____
H. Minimum/Maximum: _____

Ex 5:
Graph $y = -1/4(x + 2)^2 - 1$ and identify:



A. How it opens: up or down
B. Roots: _____
C. *Y*-Intercept: _____
D. Vertex: _____
E. Axis of Symmetry: _____
F. Domain: _____
G. Range: _____
H. Minimum/Maximum: _____

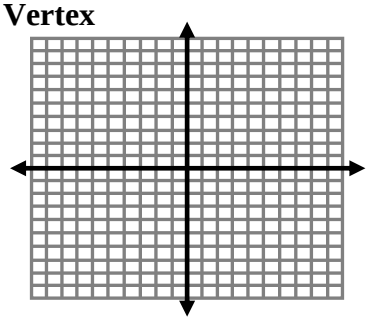
Your Turn:
Graph $y = (x - 5)^2 - 4$ and identify:



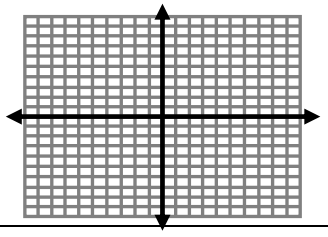
A. How it opens: up or down
B. Roots: _____
C. *Y*-Intercept: _____
D. Vertex: _____
E. Axis of Symmetry: _____
F. Domain: _____
G. Range: _____
H. Minimum/Maximum: _____

Ex 6:
Graph $y = x^2 + 6x + 9$ and identify:

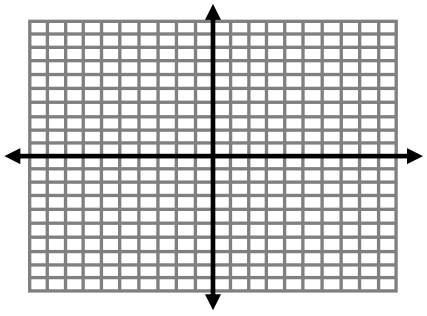
A. **Roots**
B. **Vertex**



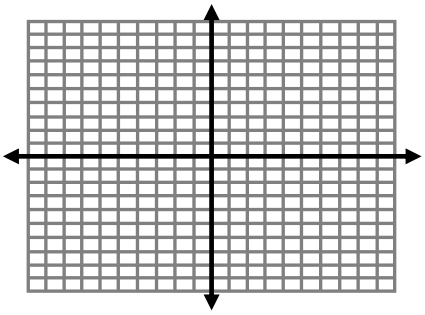
Ex 7: Write an equation of a quadratic, in vertex form, where it is reflected across the *x*–axis, vertically compressed by 2 and translated 2 units to the left and 3 units down.



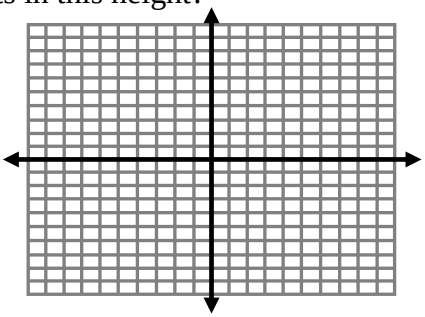
Ex 8: Write an equation of a parabola, in vertex form, where it is vertically stretched by a factor of 2.5 and translated 2 units left and 1 unit up.



Your Turn: Write an equation of a parabola, in vertex form, where it is vertically stretched by a factor of 2.5 and translated 2 units left and 1 unit up.



Ex 9: The average height h in centimeters of a certain type of grain can be modeled by the function $h(r) = 0.024r^2 - 1.28r + 33.6$, where r is the distance in centimeters between the rows in which the grain is planted. Based on this model, what is the minimum average height of the grain, and what is the row spacing that results in this height?



Assignment: WKST