2.1 Quadratic Functions and Models

- Analyze graphs of quadratic functions
- Write quadratic functions in standard form and use the result to sketch a graph
- Use quadratic functions to model real life problems

What is a Polynomial Function?

Examples:

Vocabulary

Terms (separated by + or -)

Leading term (first term when terms are in order of decreasing exponents)

Coefficient (Number preceding the variable)

Degree (exponent on the leading term when in decreasing order)

Constant term (term without a variable)

Examples of

Linear function:

Constant function:

Squaring function:

A quadratic function is a function of degree 2.

$f(x) = ax^2 + bx + c$ with $a \neq 0$

Standard form of a quadratic function

$f(x) = a(x-h)^2 + k$

Review of transformations of the quadratic function.

Sketch each of these:
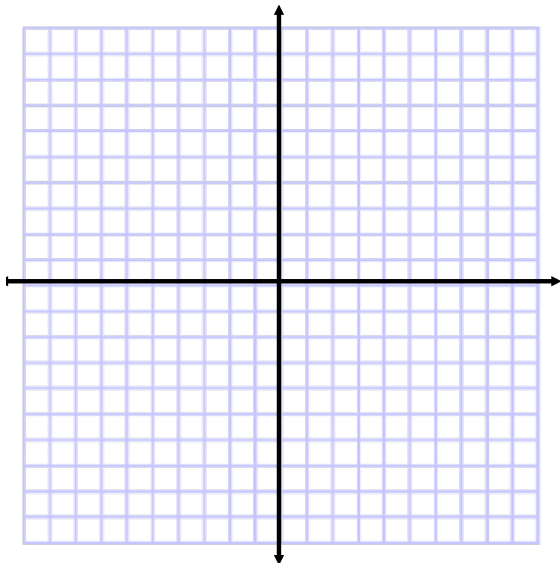
$y = -2x^2$
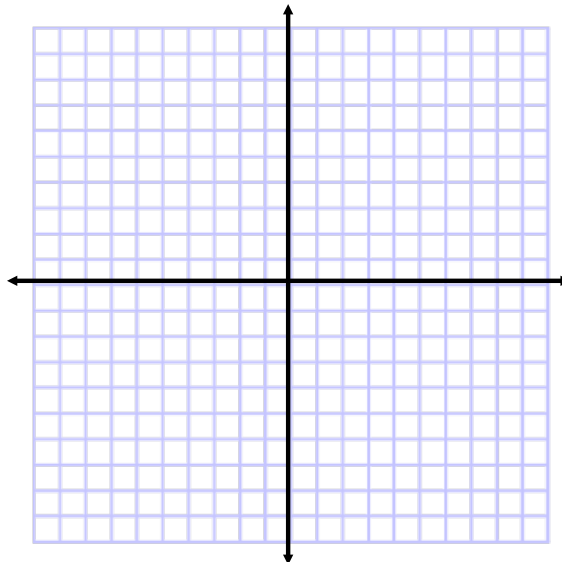
$y = x^2$

$y = x^2 - 3$

$y = (x+2)^2$

$y = 3(x-1)^2 - 4$

Example 1: Graph each of these and determine the roots.
             Show roots, axis of symmetry, vertex and y-intercept.

$y = 2(x+1)^2 - 3$

$y = 2x^2 - 8x + 6$

Finding an equation:

Determine the equation of a parabola with a vertex at (2,5) which passes
through the origin.

Application:

An object thrown straight up in the air from a height of 128 ft.with an initial velocity of 32 ft per second will travel according to this equation:

$h(t) = -16 t^2 + 32 t + 128$

How high will it go?
When will it hit the ground?