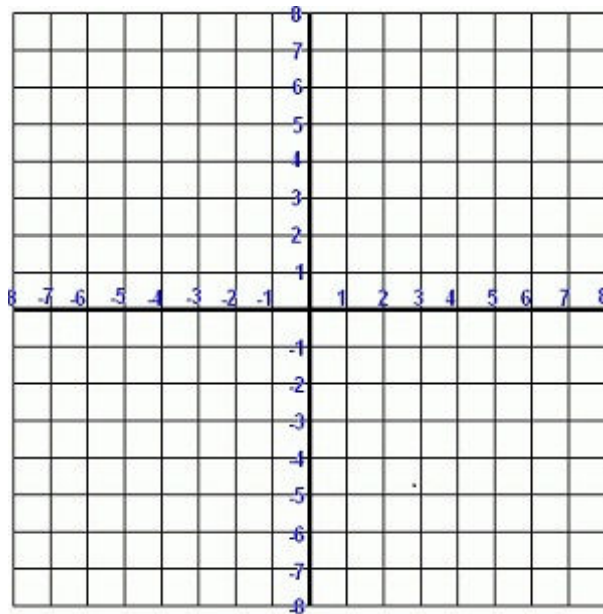


Linear and Quadratic Functions

A **linear function** f of one variable is a function where the output is determined by a linear expression. Using function notation, a **linear function** f of one variable can be written as $f(x) = mx + b$ where m and b are real numbers.

Graph the function $f(x) = \frac{2(x-1) + 12}{5}$



Definition:

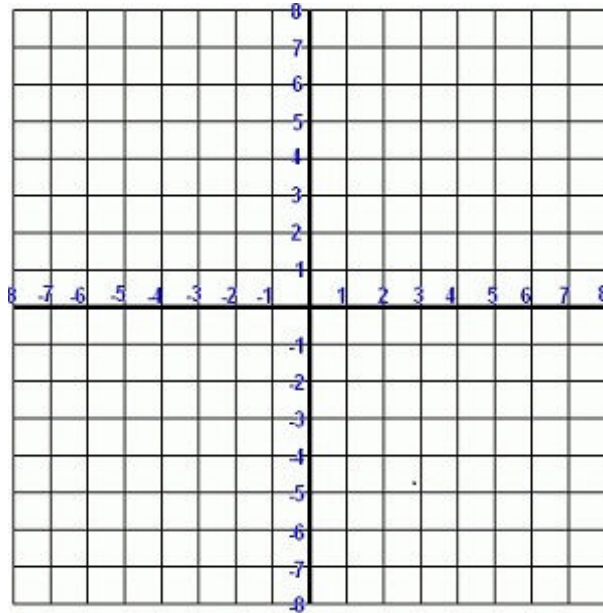
A **quadratic function** is any function that can be written in the form $f(x) = ax^2 + bx + c$ where a, b, c are real numbers and $a \neq 0$.

What does the graph of a quadratic function look like?

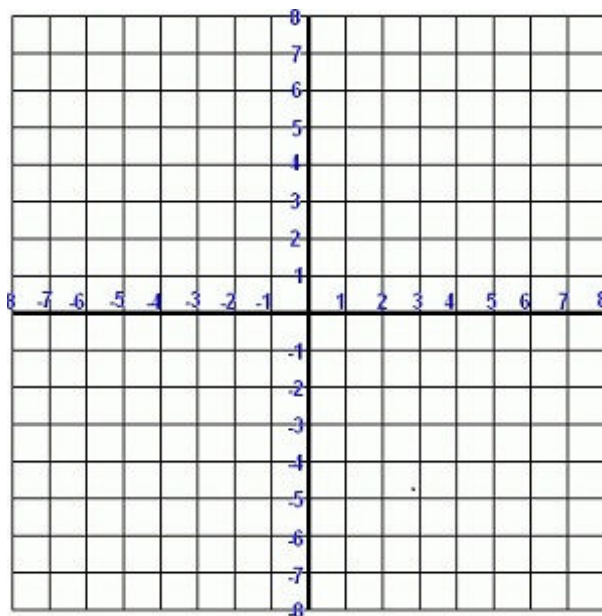
When graphing a quadratic by hand there are 4 things I want you to determine algebraically and clearly label on the graph:

1. What are the exact coordinates of the vertex.
2. Where are the x -intercepts.
3. Where is the y -intercept.
4. Two other non-intercept points on the graph.

Graph the function $h(x) = -2x^2 - x + 6$



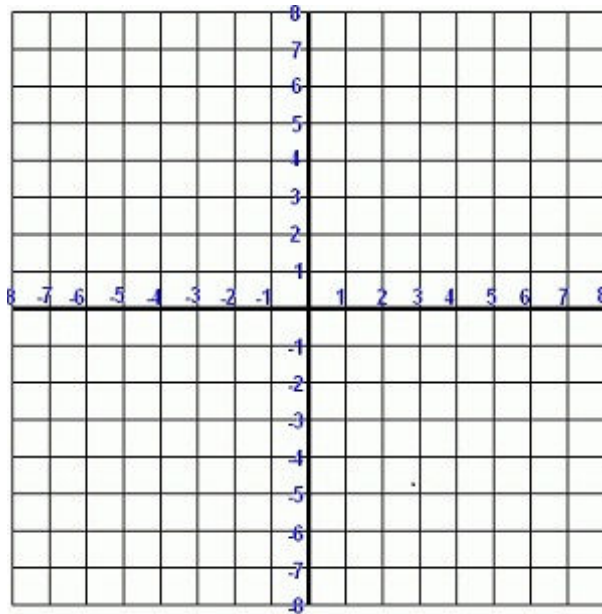
Graph the function $g(x) = x^2 + 3x + 3$



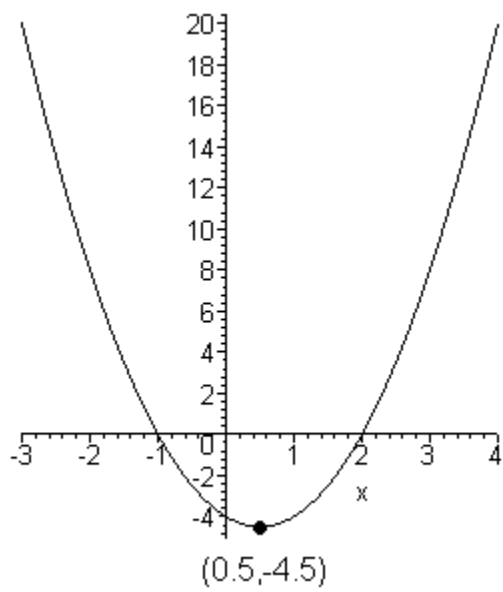
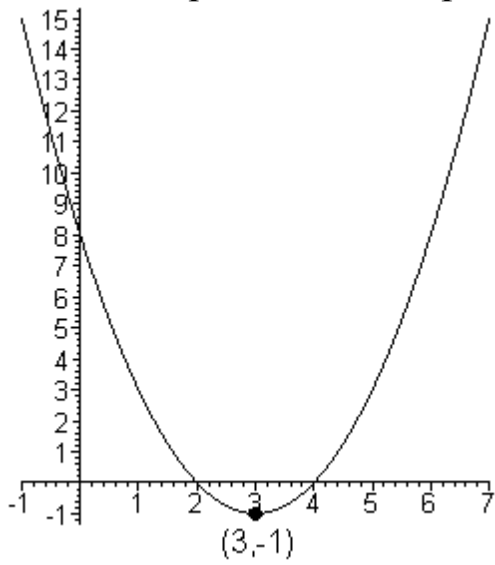
Standard form of a quadratic function:

The quadratic function $f(x) = a(x - h)^2 + k$ has a graph which is a parabola with a vertex at the point (h, k) and opens up if $a > 0$ and opens down if $a < 0$.

Graph the function $f(x) = -(x - 5)^2 - 4$



Find the equations of the parabolas that are shown below:



Max and Min Problems:

The height of a ball (in meters) that is tossed up into the air from a starting height of 1.8 meters with an initial velocity of 24.5 meters per second is given by the function $s(t) = 1.8 + 24.5t - 4.9t^2$.

What is the maximum height that is obtained by the ball?