

Name: _____

What is a quadratic function?

A quadratic function is a function where the largest power for the variable is 2. A function usually takes the form of _____.

What is a parabola?

A parabola is the graph of a quadratic function.

A parabola can either have a “u” shape or an “n” shape depending on the number in front of the term. If the number in front of x^2 is _____, the parabola will open _____; if the number in front of x^2 is _____, the parabola will open _____.

What is a vertex?

The vertex of a parabola is the _____
_____. If the parabola opens _____, the vertex is the _____

_____ or the place where the graph bottoms out. If the parabola opens _____, the vertex is the _____ or the place where the graph reaches its peak.

Quadratic functions can be written in _____, depending on what you are trying to do with the equation.

- The _____ of a quadratic function is _____
- The “a” _____ be zero or else the equation is not considered a quadratic. The standard form is most often used when solving a quadratic equation. This form should be used when factoring or using the quadratic formula.

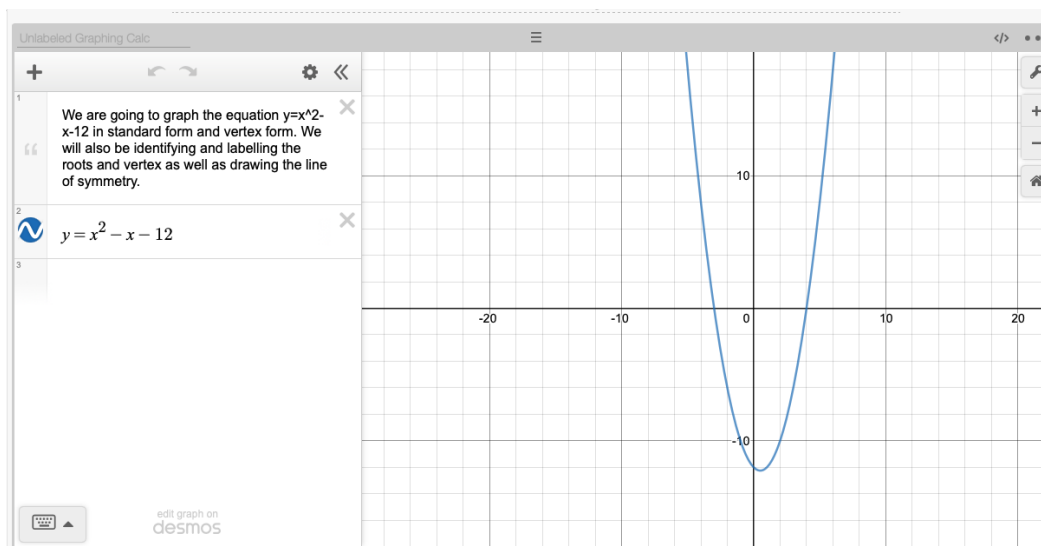
- The _____ of a quadratic function is _____. This shows the vertex is at the point _____. So when a quadratic is in this form, finding the vertex is very easy. If you are looking for the vertex and your equation is not in this form, you can use the method of completing the square to change the equation into the vertex form.

What are "zeros" or "roots"?

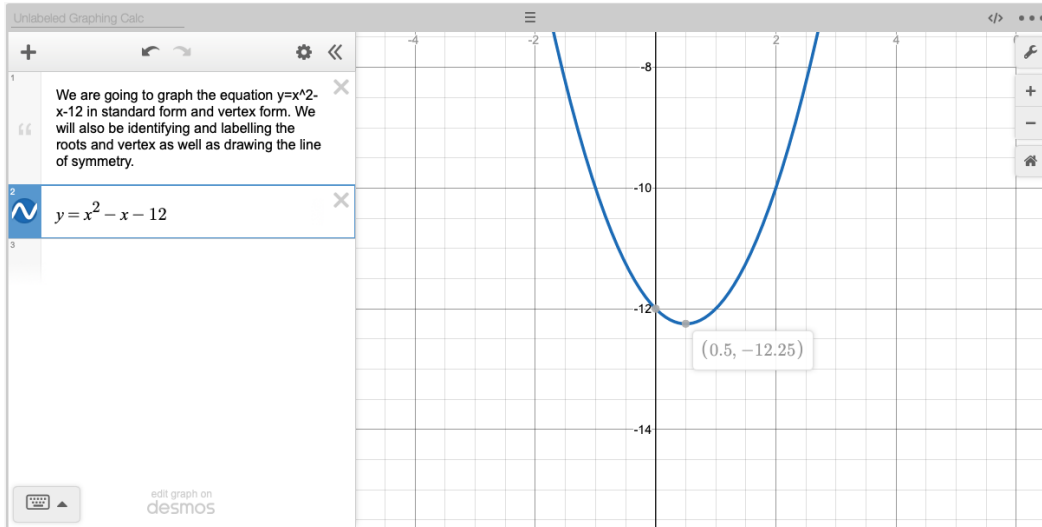
The zeros of a quadratic equation are the points where the graph of the quadratic equation crosses the _____. A parabola can also have _____, _____, or _____!

How to Graph Quadratic Functions on Desmos

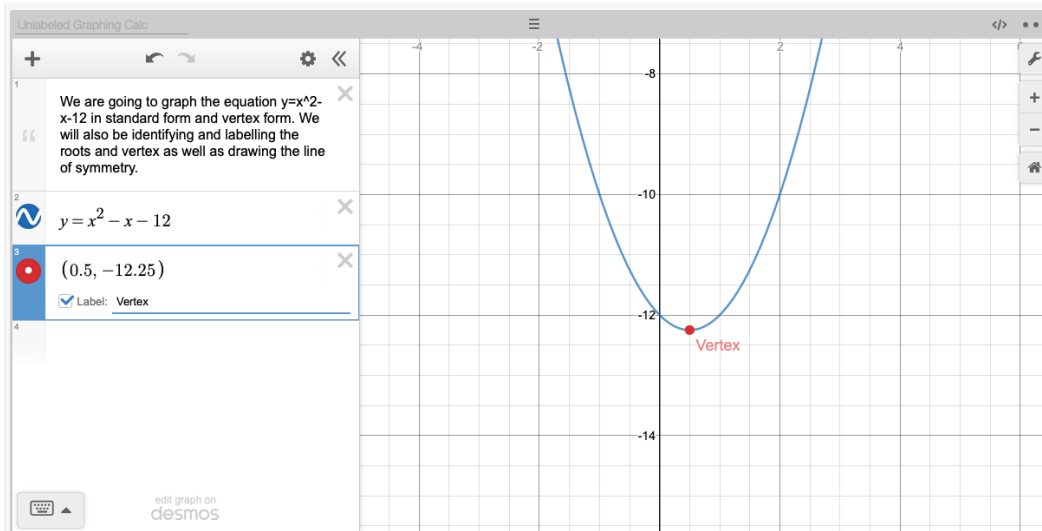
1. Click on input box 1.
2. Type the standard form of the function " $y = x^2 - x - 12$ " into the box.



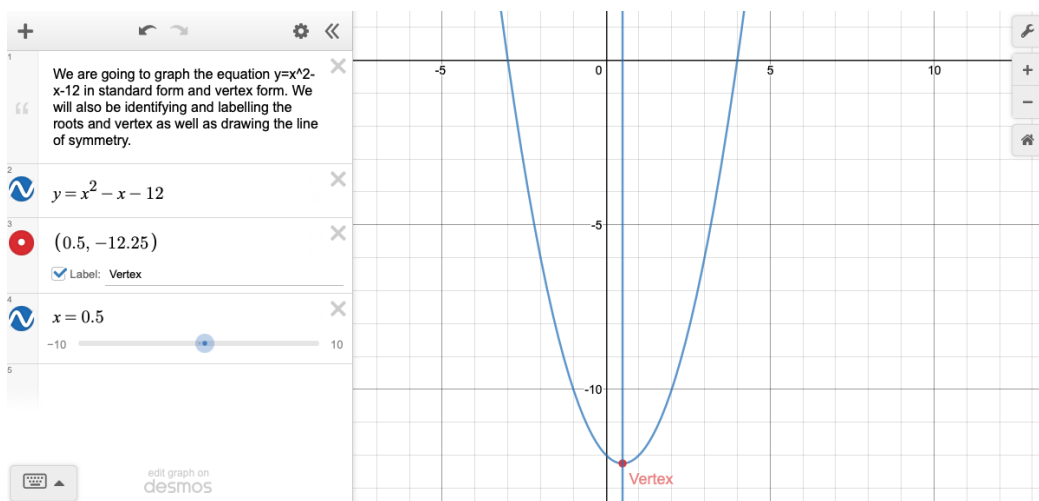
3. Click on the parabola to highlight it and find the vertex. (Remember, the vertex is the point at the intersection of the parabola and its line of symmetry!) Desmos will automatically put points on the vertex and x-intercepts (if any).



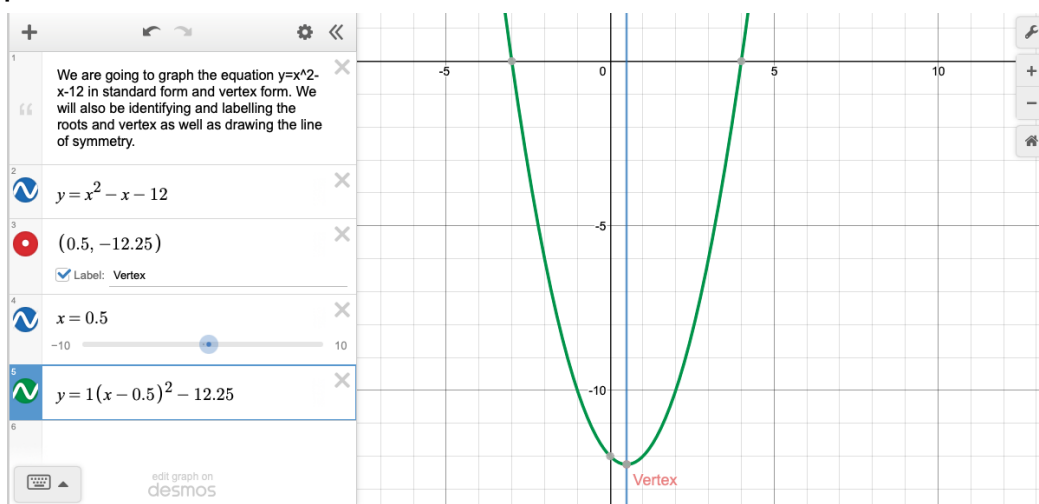
- Click on the second input box. We are going to label the vertex by typing in “(0.5, -12.25)”. After you type this, a little checkbox will appear that says “Label”. Click on the checkbox and type “Vertex”.



- Next we are going to create a line to show the line of symmetry for the parabola which passes through the vertex. We know that our x-coordinate for the vertex is 0.5, therefore we type “x=0.5” in the third input box to show our line of symmetry on the graph.



6. Now we are going to graph our function in vertex form. Since we know the formula for vertex form is $y = a(x - h)^2 + k$ with vertex (h,k) and we are given the standard form and vertex, we can fill this in to be $y = 1(x - 0.5) - 12.25$. This is what we type in input box 4 and it should completely overlap (match!) our standard form parabola!



Not every function is going to have roots! If it does, we:

7. Click to highlight the parabola again.
8. Type into input box 5 the point(s) in which the parabola passes through the x-axis. Desmos will automatically create the points for you. These are your roots!

9. Label your roots. Similarly to how we labelled the vertex, check the box that says "Label" and type "Root 1" or "Root 2".

