

Math Functions and Quadratic Functions

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1 Math Functions

Basic Python only knows how to do a few things mathematically. It's kind of like a fifth grader in that way. It can add, subtract, multiply, and divide, but it doesn't know about square roots or logarithms or other useful stuff. Unlike a fifth grader, it does not take 4 years to teach Python about these other mathematical functions; all you have to do is import the math library. Any time you want to use a more advanced math function, you should include at the top of your program (or type into the IDLE)

```
import math
```

This gives Python knowledge of a bunch more mathematical function. Here are a few examples of new things you can do once you import the math library. Try this in your IDLE!

```
>>> import math
>>> math.sqrt(4)
2.0
>>> math.log(8,2) # this finds the log base 2 of 8
3.0
>>> math.pi
3.141592653589793
>>> math.e
2.718281828459045
```

You can find a full list of math functions at <http://docs.python.org/library/math.html>. You will need to use other functions from this library in future programming assignments.

2 Programming Assignment: Quadratic Functions

2.1 Programming Assignment

Write a program that finds the (real) zeros and the vertex of a quadratic function, $f(x) = ax^2 + bx + c$. You will need to research appropriate equations to calculate the zeros and vertex. Your program should:

1. Ask the user to provide values of a , b , and c .
2. Determine how many (real) zeros the function has. Remember, a quadratic function may have zero, one, or two zeros.
3. Calculate the zero(s) and print them for the user.
4. Calculate the vertex and print it for the user.
5. Contain at least as many comments as lines of code.

Below are three examples of how my version of this program looks when I run it. Your's doesn't need to be identical, but it should be similar. Remember to comment your code well! Your future self will thank you for it.

```
This program can find the zeros of quadratic functions.
If your function is written in the form  $ax^2 + bx + c$ ,
what is a?1
what is b?1
what is c?1
There are no real zeros.
The vertex is (-0.5,0.75)
>>> ===== RESTART =====
>>>
This program can find the zeros of quadratic functions.
If your function is written in the form  $ax^2 + bx + c$ ,
what is a?1
what is b?4
what is c?1
There are two zeros,-0.267949192431 and -3.73205080757.
The vertex is (-2.0,-3.0)
>>> ===== RESTART =====
>>>
This program can find the zeros of quadratic functions.
If your function is written in the form  $ax^2 + bx + c$ ,
what is a?1
what is b?-4
what is c?4
The only zero is 2.0.
The vertex is (2.0,0.0)
```