APS106 - LAB # 2

This lab will test your ability to set up, debug and run a program, to interpret real world parameters as variables, and to use math functions. Place appropriate comments in your program. The name of the source file must be "lab2.py". ***Due: 11:59pm, Sunday, Jan. 27, 2019***

Question:

The position of a damped harmonic oscillator can be calculated by the equation:

$$x = e^{-\gamma t}\cos\left(\sqrt{w_0^2 - \gamma^2 t} - \alpha\right)$$

(*t* is not a part of the square root)

Where t is the time, γ is the damping coefficient, ω_0 is the frequency and α is the phase. **For now, assume the oscillator is 'in phase', in other words, the phase is zero.**

Note that, 'e' is the base of natural logarithm, you should use the library provided version of it, i.e. `math.e`.

Write a Python function that accepts γ, t and ω_0, as inputs and returns the calculated range as an output using the provided starter code "*lab2.py*".

Sample Inputs and Outputs: For testing your code, use your function to calculate the range for a set of inputs and print the range as the example below.

Inputs

```
damped_oscillator_position(0.1, 2, 30 ), where
gamma = 0.1      # damping coefficient
t = 2            # theta in degrees (s)
omega = 30       # angular frequence (rad/s)
```

Output

```
The position is: -0.7798529395484154(m)
```

Note: Your function should return a number. Your testing code should return a string as the above.

TO DO:

- Download the file lab2.py and complete the functions inside.
- Test your code and submit it for grading on MarkUS.

IMPORTANT: Do not change the file name or function names. Do not use input() or print() inside the function. *Five test cases are provided on MarkUS. You should test your code before your final submission. These test cases will be used in grading with additional five test cases.*