**Name: Session:**

**Programming I**

**Lab Exercise 12/16/2024**

1. Write a program that allows the user to enter their weight (on Earth) and the name of the planet and it outputs their weight on that planet. Hint: Consider using a dictionary to store the planet weight conversion factors.

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| --- | --- |
| **Planet** | **Conversion Factor** |
| Mercury | 0.4155 |
| Venus | 0.8975 |
| Earth | 1.0 |
| Moon | 0.166 |
| Mars | 0.3507 |
| Jupiter | 2.5374 |
| Saturn | 1.0677 |
| Uranus | 0.8947 |
| Neptune | 1.1794 |
| Pluto | 0.0899 |
| Eric Clapton | 5.78 x 10-10 |
| Jerry Garcia | 1.95 x 10-9 |

1. The quadratic formula returns the roots of a second degree polynomial of the form:



where a, b, and c are real numbers. The two roots are evaluated as:



Note: if b2 - 4ac = 0, the two roots are the same

Note: if b2 - 4ac > 0, the two roots are real

Note: if b2 - 4ac < 0, the two roots are complex

Write a function that accepts three parameters; a, b, and c (the coefficients of a second-degree polynomial and returns a list of the roots of the polynomial. If the roots are imaginary, return a list with the two complex numbers. The function should also plot the function using the plot function from PyLab.

1. The **Goldbach Conjecture** is a yet unproven **conjecture** stating that every even integer greater than two is the sum of two prime numbers. The **conjecture** has been tested up to 400,000,000,000,000. **Goldbach's conjecture** is one of the oldest unsolved problems in number theory and in all of mathematics. Write a function that gets an integer then first checks to make sure it is even. If it is not even, return an empty list. If it is even return a list of the two prime numbers sum to that number.