

Mathematics in our world



Project Learning how to solve and model real life scenarios is an important skill that many learn in their elementary algebra es. One of the types of equations, which are extremely emphasized, is the quadratic equation, because it can be used often in the business world. Like so, there are many ways in which a quadratic equation can be manipulated and solved for. One of such ways was developed in India and can be seen in the equations $x^2-2x-13$ and $x^2+12x-64$.

$$x^2-2x-13= 0$$

$$x^2-2x= 13$$

$$4x^2-8x= 52$$

$$4x^2-8x+4= 52+4$$

$$4x^2-8x+4= 56$$

$$\sqrt{4x^2-8x+4}= \sqrt{56}$$

$$x = -1+\sqrt{14}, -1-\sqrt{14}$$

$$x^2+12x-64$$

$$x^2+12x= 64$$

$$4x^2+48x= 256$$

$$4x^2+48x+4= 256+4$$

$$4x^2+48x+4= 260$$

$$\sqrt{4x^2+48x+4}= \sqrt{260}$$

$$x = -1+\sqrt{65}, -1-\sqrt{65}$$

This method has its advantages in which it can help someone solve a quadratic equation. In these cases, the factorization and quadratic formula would result in long tedious math. This means that the likelihood of errors occurring would increase. This technique allows you to solve for the zeros of the quadratic equation much easier and simpler than other methods.

Project 2

There are many different equations and mathematical sequences, which have been discovered by mathematicians that yield intriguing properties. For example, the Fibonacci sequence and the Mandelbrot set are famous mathematical constructs dealing with patterns of number that have a specific set of problems. Euler, another famous mathematician, came up with an equation that gives prime numbers: x^2-x-41 .

x

y

-2

47

-1

43

0

41

1

41

2

43

Since this equation results in the output of only prime numbers, we set $y = 4$, which is a composite number to see if its possible to generate the result.

$$y = x^2-x-41$$

$$\text{Assume } y = 4$$

$$4 = x^2-x-41$$

$$x = \frac{-7 \pm \sqrt{33}}{2}, \frac{7 \pm \sqrt{33}}{2}$$

Assuming a composite number as the solution of the set results in an

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imaginary number, therefore Euler's formula does not allow for composite numbers.

In this problem, it is useful to try and find descriptive data in order to see the pattern in the quadratic as a model of predictability. In the case of the data that was used, all were prime numbers. Therefore, in order to see if it was possible to solve for a composite using Euler's formula, it shows that the answer is non-real. Assumptions and restrictions are used everyday in real world modeling, such as in finance and business.