Origin of the Quadratic Formula (#37)

By: Jamie True

**Egyptians:** Had words and charts to solve quadratic problems

**China:** There is evidence of completing the square in 200 BC

**Babylonians:** Used numbers, positive only, no notion of equations, credited with essentially completing the square in 400 BC

**Greeks:** First attempt at a formula in 500 BC, by Pythagoreans, geometrical approach, no equations, no negatives, Euclid’s formula published but could not calculate a square root

**Hindus:** Took Babylonian approach further (completing the square), added the concept of zero, admit negative quantities, used letters for unknowns, accepted irrationals. Brahmagupta credited with concept of two roots in 628 AD.

**Arabs:** Didn’t know of Hindu advances, had no negatives or letters for unknowns, no zeros. Al-Khwarizmi (800 AD) gave classification of different types of quadratics in six chapters. He essentially uses the quadratic formula, and then gives proof by geometrically completing the square.

**Spain:** Abraham bar Hyya Ha-Nasi brings Arab knowledge to Spain in 1100. Publishes a book in 1145, the first to give complete solution of quadratic equations in Europe.

**New phase of math around 1500 in Italy**

**Luca Pacioli:** Writes a summary of knowledge known on the subject, discusses quartics being solved much like quadratics

**Scipione dal Ferro:** (1465-1526) Solved certain cubics in 1515, but kept secret until his death when he passed the knowledge to his student, Fior.

**Antonio Fior:** Challenged Tartaglia to solve cubics. Tartaglia won, he had found the general solution for all cubics.

**Girolamo Cardan:** Got the news of Tartaglia and convinced him to tell him, promising to keep the information secret, but broke his promise and published in 1545.

Cardan acknowledged negative square roots, but did not understand his own calculations.

**Lodovico Ferrari:** A student of Cardan, solved quartics by completing the square

Bombelli, Viete, Harriot, Tschirnhaus, Euler, Bezout, Descartes….

**Harriot:** stated that if a, b, c, are solutions, then \((x-a)(x-b)(x-c) = 0\) Which is the first method of algebraic proof.
Henry Heaton: (1896) Apparently states the general solution for the first time in modern mathematical literature

The Quadratic Formula, as we know it today, is derived by completing the square with the general form of the quadratic equation. The concept of completing the square was used by many cultures. My research ended with Henry Heaton, although I am not positive that he was the first to print the modern form of the formula.

