

Mathematical Connections

Hypatia – By Terry Mowry

Hypatia's was born in 355AD in Alexandria Egypt where she lived till her death in 510AD she was never married and never had any children. Throughout her childhood, Historians believe that her father tried to raise her to be perfect. Theon taught Hypatia his own knowledge and shared his passion in the search for answers to the unknown. As Hypatia grew older, she began to develop an enthusiasm for mathematics and the sciences.

Most historians believe that Hypatia surpassed her father's knowledge at a young age. However, while Hypatia was still under her father's discipline, he also developed for her a physical routine to ensure for her a healthy body as well as a highly functional mind. In her education, Theon instructed Hypatia on the different religions of the world and taught her how to influence people with the power of words. He taught her the fundamentals of teaching, so that Hypatia became a profound orator. People from other cities came to study and learn from her. Hypatia's studies included astronomy, astrology, and mathematics.

Hypatia was known more for the work she did in mathematics than in astronomy, primarily for her work on the ideas of conic sections introduced by Apollonius. She edited the work *On the Conics of Apollonius*, which divided cones into different parts by a plane. This concept developed the ideas of hyperbolas, parabolas, and ellipses. With Hypatia's work on this important book, she made the concepts easier to understand, thus

making the work survive through many centuries. Hypatia was the first woman to have such a profound impact on the survival of early thought in mathematics.

Hypatia lived in Alexandria when Christianity started to dominate over the other religions. In the early 390's, riots broke out frequently between the different religions. Cyril, a leader among the Christians, and Orestes, the civil governor, opposed each other. Hypatia was a friend of Orestes and it is believed that Cyril spread virulent rumors about her. In 415 AD, on Hypatia's way home, a mob attacked her, stripped her and killed her with pieces of broken pottery. Later, the mob dragged her through the streets.

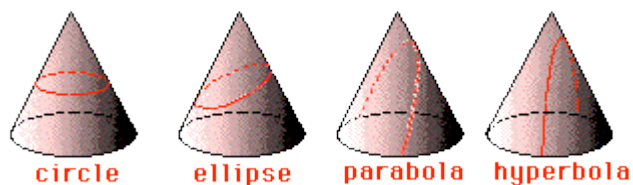
Hypatia's life ended tragically, however her life's work remained. Later, Descartes, Newton, and Leibniz expanded on her work. Hypatia made extraordinary accomplishments for a woman in her time. Philosophers considered her a woman of great knowledge and an excellent teacher.

What are “The Conics”!

The Conics, or The Conic Sections are four conic sections, circle, ellipse, parabola, hyperbola can be seen as slices of a cone.

1. If the cone is sliced parallel to the base, the resulting curve is a circle.
2. If the cone is sliced on a slight angle, the curve is called an ellipse, as shown below.

The orbits of the planets are elliptical and the earth itself is an ellipsoid. A circle viewed from an angle looks like an ellipse.



3. If the slice is made parallel to the edge of the cone, the curve formed is called a parabola, an open curve whose sides do not meet, as shown above. The parabola is the path followed by a thrown ball or by a spout of water in a fountain. Upside down parabolas are seen in some suspension bridges.

4. If the slice is perpendicular to the base of the cone, the curve is one of two branches of a hyperbola, as shown above. Mathematicians are interested in two branches of the hyperbola, formed by putting two cones together. The pattern of light cast on a wall by a lampshade is a hyperbola.

<http://www.agnesscott.edu/lriddle/women/hypatia.htm>

<http://www.cosmopolis.com/alexandria/hypatia-bio-suda.htm>

<http://mathforum.org/~sanders/geometry/GP16Conics.html>