



Conic Sections

TVO

Mathematics, Algebra

Math SOL

6 10-minute programs

One Year Tape and Keep Rights

No Duplication Rights

This series investigates the properties of the figures known as conic sections. Three-dimensional computer animation depicts the slicing of a right circular cone with a plane at different angles. The functional properties of the conic sections are introduced by demonstrating some practical methods for drawing conics. The equation of a circle on the Cartesian plane is developed and transformation mappings are applied to it. The equations for the ellipse, the parabola, and the hyperbola are introduced and transformations are applied to each. The series concludes with some applications of conic sections in everyday life.

101. Slicing the Cone

Math: AII.18, AII/T.18

The standard double-napped right circular cone is introduced, and the seven conic sections are discovered when the cone is sliced at various positions and angles with a plane. The four proper conics are explored in detail, and the functional properties of the circle, ellipse, parabola, and hyperbola are developed.

102. Circles

Math: AII.18, AII/T.18, MA.8

The distance formula for two points on the Cartesian plane is used to derive the equation for a circle in standard position. Individual transformations are applied to the circle to develop the general equation for a circle in any position on the plane.

103. Ellipses

Math: AII.18, AII/T.18, MA.8

An ellipse is removed from the cone and placed on the Cartesian plane cen-

tered at the origin. The equation in standard position is developed, and transformation techniques are introduced to build up the general equation for any position. Also, major and minor axes, vertices, foci eccentricity, and the constant sum definition of an ellipse are covered.

104. Parabolas

Math: AII.18, AII/T.18, MA.8

The standard equation for a parabola is given, and the concepts of focus and directrix are developed. Transformation techniques are used to illustrate the properties of parabola families, and to obtain the combined general equation. Finding the general shape and position of a parabola from its equation is demonstrated.

105. The Hyperbola

Math: AII.18, AII/T.18, MA.8

The equation for a hyperbola in standard position is developed and, through transformation techniques, expanded into the general equation.

Viewers also learn about transverse and conjugate axes, a method for determining the equations of the asymptotes, inverse variation, and the constant-difference definition.

106. Conic Reflections

Math: AII.18, AII/T.18, MA.8

Some examples of conic sections in everyday life lead to a detailed study of two numerical applications of conic sections: parabolic versus ellipsoidal headlight designs in cars, and the hyperbola-shaped path of the sonic boom of an airplane.

Additional Resource Information:

Videodisc with Teacher's Guide and Bar-coded Interactive Sheets available from the distributor.