

Math History for Precalculus

Christiaan Huygens

1. When did Huygens (HIE genz) live? *1629–1695*
2. Where was he from? *Holland (The Hague)*
3. What was his marital status? *lifelong bachelor*
4. What was his most famous work and when was it published? *Horologium Oscillatorium, 1673*

This famous work discussed pendulum clocks. Pendulum motion is periodic and is described using trigonometric functions. The most important mathematical result in this work involves the study of a curve—the cycloid. He discovered a very important property of this curve. In later works he studied other important mathematical curves and their properties. Describe each curve below and explain what Huygens discovered about it.

- | | Curves | Discovery | |
|----|----------|--|--|
| 5. | Cycloid | <i>Determined by a point on a wheel as it rolls along the (level) ground</i> | <i>It is the tautochrone (time needed for a ball to roll to lowest point is equal regardless of starting point).</i> |
| 6. | Catenary | <i>Determined by suspending a cable from two points</i> | <i>It is not a parabola.</i> |
| 7. | Cissoid | <i>Determined by secant segments of a circle</i> | <i>It is rectifiable (found arc length formula).</i> |
8. Which of the three previous curves are functions? *cycloid, catenary*
 9. Huygens wrote on the paraboloid, a surface formed by revolving a parabola about its axis. What did he discover? *Its surface area*
 10. Huygens also wrote the first treatise on probability (following the correspondence of Pascal and Fermat). What concept did he contribute to this subject? *expectation*
 11. Name some of his famous scientific theories. *rings of Saturn (1654–1656, using his own improved telescope lenses); pendulum clocks (1658); wave theory of light (1678, 1690)*
 12. How did these discoveries result in a move to France? When? *In 1665, Louis XIV offered him a pension to live in Paris based on his scientific reputation.*
 13. What were Huygens’s religious views? *Protestant Christian*
 14. How does his departure from France shed light on his religious convictions? *He fled to Holland because of Catholic intolerance for Protestants. When France revoked the Edict of Nantes, he severed even his communication on principle. Such actions show a commitment to Protestant convictions.*