

Malfatti, Gian Francesco | Encyclopedia.com

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(*b* Ala, Trento, Italy, 1731; *d.* Ferrara, Italy, 9 October 1807)

mathematics.

After completing his studies in Bologna under the guidance of Francesco Maria Zanotti, Gabriele Manfredi, and Vincenzo Riccati, Malfatti went to Ferrara in 1754, where he founded a school of mathematics and physics. In 1771, when the University of Ferrara was reestablished, he was appointed professor of mathematics. He held this post for about thirty years, teaching all phases of mathematics from Euclidean geometry to calculus.

Malfatti became famous for his paper “De aequationibus quadrato-cubicis disquisitio analytica” (1770), in which, given an equation of the fifth degree, he constructed a resolvent of the equation of the sixth degree, that is, the well-known Malfatti resolvent. If the root is known, the complete resolution of the given equation may be deduced. The latter, however, cannot be obtained by means of rational root expressions; rather, as Brioschi later demonstrated, it is obtained by means of elliptical transcendents.

Malfatti also demonstrated that a memoir on the theory of probability, published by Lagrange in 1774 and proclaimed by Poisson as “one of Lagrange’s most beautiful works,” nevertheless required explanation at one point.

In a brief treatise entitled *Della curva cassiniana* (1781), Malfatti demonstrated that a special case of Cassini’s curve, the lemniscate, has the property that a mass point moving on it under gravity goes along any arc of the curve in the same time as it traverses the subtending chord.

In 1802 Malfatti gave the first, brilliant solution of the problem that bears his name: “Describe in a triangle three circumferences that are mutually tangent, each of which touches two sides of the triangle.” Many illustrious mathematicians had dealt with this problem. Jacques Bernoulli (1654–1705) had earlier dealt with the special case in which the triangle is isosceles. An elegant geometric solution was supplied by Steiner (*Crelle’s Journal*, vol. 1, 1826), while Clebsch, dealing with the same problem in 1857, made an excellent application of the elliptical functions (*Crelle’s Journal*, vol. 53, 1857).

In a letter to A. M. Lorgna (27 April 1783), Malfatti gave the polar equation concerning the squaring of the circle.

BIBLIOGRAPHY

I. Original Works. Among Malfatti’s works are “De aequationibus quadrato-cubicis disquisitio analytica,” in *Atti dell’ Accademia dei Fisiocritici di Siena* (1770); *Memorie della Società italiana delle scienze detta dei XL*, **3**; *Della curva cassiniana* (Pavia, 1781); *Memorie della Società italiana delle scienze detta dei XL*, **10** (1802); and his letter to Lorgna, in *Bullettino di bibliografia e di storia delle scienze matematiche e fisiche*, **9** (1876), 438.

II. Secondary Literature. For further information on Malfatti and his work, see G. B. Biadego, “Intorno alla vita e agli scritti di Gianfrancesco Malfatti, matematico del sec. XVIII°,” in *Bullettino di bibliografia e storia delle matematiche del Boncompagni*, **9** (1876); E. Bortolotti, “Sulla risolvente di Malfatti,” in *Atti dell’ Accademia di Modens*, 3rd ser., **7** (1906); “Commemorazione di G. F. Malfatti,” in *Atti della XIX riunione della Società italiana per il progresso delle scienze* (1930). Also see articles on Malfatti in *Enciclopedia italiana* (Milan, 1934), XXII, 16; F. Brioschi, “Sulla risolvente di Malfatti,” in *Memorie dell’ Istituto lombardo di scienze e lettere*, **9** (1863); Gino Loria, *Curve piane speciali: Teoria e storia* (Milan, 1930), I, 265, and II, 23; and *Storia delle matematiche*, 2nd ed. (Milan, 1950), *passim*; A. Procissi, “Questioni connesse al problema di Malfatti e bibliografia,” in *Periodico di matematiche*, 4th ser., **12** (1932); and A. Wittstein, *Geschichte des Malfatti’schen Problems* (Munich, 1871).

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