

1106-VM-2269      **Faruk F. Abi-Khuzam\*** (farukakh@aub.edu.lb), Beirut, Lebanon. *Geometry of the Fermat-Torricelli problem.*

Given a triangle  $A$  and weights  $m_1, m_2, m_3$ , a geometric proof is given of (a) the existence of a point  $F$  whose weighted distance sum  $m_1|F - A_1| + m_2|F - A_2| + m_3|F - A_3|$  has the smallest possible value, (b) the value of this minimum, and (c) the construction of the point. A characterization of the weights that guarantees the point is inside the triangle is given. This is then used to supply solutions to three extremal problems, as well as to generate sharp inequalities connecting the elements of triangle  $A_1A_2A_3$ . (Received September 16, 2014)