Quiz 2: Lagrange’s method

You have two final exams upcoming, and have to decide how to allocate your time during the reading period. After eating, sleeping, exercising, and maintaining some human contact, you will have 10 hours each day in which to study for your exams. You have figured out that your grade point average (G) from your two courses, Mathematical Methods and French Fiction, takes the form

\[ G = \frac{4}{7} (2\sqrt{F} + \sqrt{M}), \]

where \( F \) is the number of hours per day spent studying for French Fiction and \( M \) is the number of hours per day spent studying for Mathematical Methods (these are to be regarded as continuous variables). You only care about your GPA. What is your optimal allocation of study time? If you follow this optimal strategy, what will be your GPA? What will be the shadow value (price), measured in GPA units, of the study time?