In this paper, we present an analytic solution for double Laplace transform of the price of a continuous Asian option under the Black-Scholes model, which can be inverted numerically via two-sided Euler inversion algorithm. Error bound of the numerical inversion is derived theoretically. Numerical results indicate that this method is efficient and accurate. In addition, a theoretical contribution of the paper is that we give a direct proof of our result by solving a PDE rather than using Bessel process and Lamperti’s relation.