Atomic Time Mean Equinoctial and Solstitial Year Lengths, by Numerical Integration
expressed as the number of atomic minutes and seconds in excess of 365 days and 5 hours

\[ \text{Tropical Year Length} (\text{year}) = MARY + \cos\left(\frac{7600 + \text{year}}{6400}\right) \times 33 \text{ seconds} \]

where \( MARY = 365 + \frac{31}{128} \) atomic days, with best fit from 13500 BC to 23500 AD.

\[ \text{Elapsed Tropical Days} (\text{year}) = \left\{ \frac{420759 \text{ year} - 2816 (\sin \frac{19}{16} - \sin \left(\frac{7600 + \text{year}}{6400}\right))}{1152} \right\} / 1152 \]