17. The last day of the 20 centuries is longer than the first day by

$$(20\,\text{century})(0.001\,\text{s/century}) = 0.02\,\text{s}\,.$$

The average day during the 20 centuries is $(0 + 0.02)/2 = 0.01$ s longer than the first day. Since the increase occurs uniformly, the cumulative effect T is

$$\begin{aligned} T &= (\text{average increase in length of a day})(\text{number of days}) \\ &= \left(\frac{0.01\,\text{s}}{\text{day}}\right)\left(\frac{365.25\,\text{day}}{\text{y}}\right)(2000\,\text{y}) \\ &= 7305\ \text{s} \end{aligned}$$

or roughly two hours.