

$$\frac{1}{T_{sidereal}} = \frac{1}{T_{solar}} + \frac{1}{T_{year}}$$

$$\Rightarrow \boxed{T_{sidereal} = \frac{T_{solar} T_{year}}{T_{solar} + T_{year}}}$$

where  $T_{sidereal}$ ,  $T_{solar}$  and  $T_{year}$  represent sidereal day, solar day and year respectively.

$$T_{solar} = 24 \text{ hours}$$

$$T_{year} \approx 8766 \text{ hours}$$

$$\Rightarrow \boxed{T_{sidereal} \approx 23.93 \text{ hours}}$$