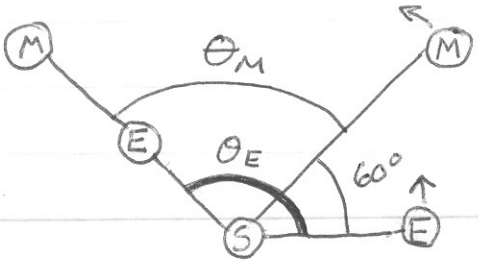
9.62 Extra Credit



Since Earth revolves around the sun at a faster angular velocity than Mars, we must allow Earth to "catch up" or to have an angular displacement of 60° (1.05 rad) more than Mars:

$\theta_E = \theta_M + 1.05$, where θ_E is the angular displacement of Earth, and θ_M is that for Mars. (see diagram)

They are both traveling at a constant ω, hence

$$\omega_E t = \omega_M t + 1.05$$

Since we are interested in the time this will take, we can solve for t, noting that

$$\omega_E = \frac{2\pi}{1\ \text{year}} \quad \text{and} \quad \omega_M = \frac{2\pi}{1.9\ \text{year}}$$

We have $$t = \frac{1.05}{\omega_E - \omega_M} = \frac{1.05}{2\pi\left(\frac{1}{1\,\text{yr}} - \frac{1}{1.9\,\text{yr}}\right)}$$

or simplifying

$$\boxed{\begin{aligned} t &= 0.35\ \text{year} \\ &= 130\ \text{days} \end{aligned}}$$

Note: I've kept only 2 significant digits.