12. (a) Eq. 30-12 gives the field at the center of the large loop with $R = 1.00$ m and current $i(t)$. This is approximately the field throughout the area ($A = 2.00 \times 10^{-4}$ m^2) enclosed by the small loop. Thus, with $B = \mu_0 i/2R$ and $i(t) = i_0 + kt$ (where $i_0 = 200\,\mathrm{A}$ and $k = (-200\,\mathrm{A} - 200\,\mathrm{A})/1.00\,\mathrm{s} = -400\,\mathrm{A/s}$), we find

$$\begin{aligned} B\big|_{t=0} &= \frac{\mu_0 i_0}{2R} = \frac{(4\pi \times 10^{-7}\,\mathrm{H/m})(200\,\mathrm{A})}{2(1.00\,\mathrm{m})} = 1.26 \times 10^{-4}\,\mathrm{T}\ , \\ B\big|_{t=0.500\,\mathrm{s}} &= \frac{(4\pi \times 10^{-7}\,\mathrm{H/m})[200\,\mathrm{A} - (400\,\mathrm{A/s})(0.500\,\mathrm{s})]}{2(1.00\,\mathrm{m})} = 0\ , \\ B|_{t=1.00\,\mathrm{s}} &= \frac{(4\pi \times 10^{-7}\,\mathrm{H/m})[200\,\mathrm{A} - (400\,\mathrm{A/s})(1.00\,\mathrm{s})]}{2(1.00\,\mathrm{m})} = -1.26 \times 10^{-4}\ \mathrm{T}\ . \end{aligned}$$

(b) Let the area of the small loop be a. Then $\Phi_B = Ba$, and Faraday's law yields

$$\begin{aligned} \mathcal{E} &= -\frac{d\Phi_B}{dt} = -\frac{d(Ba)}{dt} = -a\frac{dB}{dt} = -a\left(\frac{\Delta B}{\Delta t}\right) \\ &= -(2.00 \times 10^{-4}\,\mathrm{m}^2)\left(\frac{-1.26 \times 10^{-4}\,\mathrm{T} - 1.26 \times 10^{-4}\,\mathrm{T}}{1.00\,\mathrm{s}}\right) = 5.04 \times 10^{-8}\ \mathrm{V}\ . \end{aligned}$$