For the local load vector:

$$\int_E f\,\varphi_i\,dx = \int_{\hat{E}} \hat{f}\circ F^{-1}\,\hat{\varphi}_i\circ F^{-1}\,d\hat{x}$$
$$= \int_{\hat{E}} \hat{f}\,\hat{\varphi}_i\,|\det B|\,d\hat{x}$$
$$\text{approx. by quadrature} \quad \approx \frac{1}{2}\,\hat{f}\left(\tfrac{1}{3},\tfrac{1}{3}\right)\,\hat{\varphi}_i\left(\tfrac{1}{3},\tfrac{1}{3}\right)\,|\det B|$$

For the local stiffness matrix:
Let

$$B^{-1} = \begin{pmatrix} C_{11} & C_{12} \\ C_{21} & C_{22} \end{pmatrix}$$

Then:

$$\int_E \nabla\phi_i \nabla\phi_j dx = \dots$$
$$= |\det B|\,\big[(C_{11}^2 + C_{12}^2)A^{xx} + (C_{21}^2 + C_{22}^2)A^{yy} + (C_{11}C_{21} + C_{12}C_{22})\,(A^{xy} + A^{yx})\big]$$

where

$$A^{ij} = \int_{E_0} \partial_i\varphi\partial_j\varphi dx$$

from exercise 13.