From this, we find

$$\partial_i p = \frac{F_i}{2\pi|\boldsymbol{x}|^2} - 2\frac{F_j x_j x_i}{2\pi|\boldsymbol{x}|^4} = \frac{F_j}{2\pi|\boldsymbol{x}|^2}\left(\delta_{ij} - 2\frac{x_j x_i}{|\boldsymbol{x}|^2}\right) \tag{5.53}$$

and

$$\begin{aligned}
\partial_k J_{ij} &= \frac{1}{4\pi\mu}\partial_k\left[-\delta_{ij}\ln\left(\frac{|\boldsymbol{x}|}{a}\right) + \frac{x_i x_j}{|\boldsymbol{x}|^2}\right] \\
&= \frac{1}{4\pi\mu}\left[-\delta_{ij}\frac{1}{|\boldsymbol{x}|}\partial_k|\boldsymbol{x}| + \partial_k\left(\frac{x_i x_j}{|\boldsymbol{x}|^2}\right)\right] \\
&= \frac{1}{4\pi\mu}\left[-\delta_{ij}\frac{x_k}{|\boldsymbol{x}|^2} + \left(\delta_{ik}\frac{x_j}{|\boldsymbol{x}|^2} + \delta_{jk}\frac{x_i}{|\boldsymbol{x}|^2} - 2\frac{x_i x_j x_k}{|\boldsymbol{x}|^4}\right)\right].
\end{aligned} \tag{5.54}$$