3.8.13

$$\begin{aligned} y &= \ln(t^2); \\ \mathrm{d}y &= \mathrm{d}\Big(\ln(t^2)\Big); \\ &= \frac{\mathrm{d}(t^2)}{t^2}; \\ &= \frac{2t\,\mathrm{d}t}{t^2}; \\ \frac{\mathrm{d}y}{\mathrm{d}t} &= \frac{2t}{t^2} = \frac{2}{t}. \end{aligned}$$

Alternatively, you could simplify first:

$$\begin{aligned} y &= \ln(t^2) = 2\ln t; \\ \mathrm{d}y &= \mathrm{d}(2\ln t) = 2\,\mathrm{d}(\ln t) = 2\frac{\mathrm{d}t}{t}; \\ \frac{\mathrm{d}y}{\mathrm{d}t} &= \frac{2}{t}. \end{aligned}$$

3.8.75 This one is definitely easiest if you simplify first:

$$\begin{aligned} y &= \log_4 x + \log_4 x^2 \\ &= \frac{\ln x}{\ln 4} + \frac{\ln x^2}{\ln 4} \\ &= \frac{\ln x}{\ln 4} + \frac{2\ln x}{\ln 4}; \\ \frac{\mathrm{d}y}{\mathrm{d}x} &= \frac{1/x}{\ln 4} + \frac{2/x}{\ln 4} = \frac{1}{x\ln 4} + \frac{2}{x\ln 4}. \end{aligned}$$

3.9.21

$$\begin{aligned} y &= \cos^{-1}(x^2) \\ \mathrm{d}y &= -\frac{\mathrm{d}(x^2)}{\sqrt{1-(x^2)^2}} \\ &= -\frac{2x\,\mathrm{d}x}{\sqrt{1-x^4}}; \\ \frac{\mathrm{d}y}{\mathrm{d}x} &= -\frac{2x}{\sqrt{1-x^4}}. \end{aligned}$$

3.9.35

$$\begin{aligned} y &= \csc^{-1}(\mathrm{e}^t); \\ \mathrm{d}y &= -\frac{\mathrm{d}(\mathrm{e}^t)}{|\mathrm{e}^t|\sqrt{(\mathrm{e}^t)^2-1}} \\ &= -\frac{\mathrm{e}^t\,\mathrm{d}t}{\mathrm{e}^t\sqrt{\mathrm{e}^{2t}-1}}; \\ \frac{\mathrm{d}y}{\mathrm{d}t} &= -\frac{\mathrm{e}^t}{\mathrm{e}^t\sqrt{\mathrm{e}^{2t}-1}} = -\frac{1}{\sqrt{\mathrm{e}^{2t}-1}}. \end{aligned}$$