

(1)

$$\begin{aligned}f(x) &= \cos (x) \cosh (x) \\ \frac{d[f(x)]}{dx} &= -\sin (x) \cosh (x) + \cos (x) \sinh (x)\end{aligned}$$

(2)

$$\begin{aligned}g(t) &= \sin (t) \operatorname{asin}(t) \\ \frac{d[g(t)]}{dt} &= \cos (t) \operatorname{asin}(t) + \frac{\sin (t)}{\sqrt{1-t^2}}\end{aligned}$$

(3)

$$\begin{aligned}f(x, y, z) &= -z^2(x-2 y)-3 z+\log \left(\frac{x}{2 y}\right) \\ \nabla f(x, y, z) &= \left[\begin{array}{c} -z^2+\frac{1}{x} \\ 2 z^2-\frac{x}{y} \\ -2 z(x-2 y)-3 \end{array}\right]\end{aligned}$$

(4)

$$\begin{aligned}g(x, y) &= \sin (x) \cos (y) \\ \nabla g(x, y) &= \left[\begin{array}{c} \cos (x) \cos (y) \\ -\sin (x) \sin (y) \end{array}\right]\end{aligned}$$