問題 3.8.1

$$\frac{d}{dx}\sin\frac{3x-5}{4} = \cos\frac{3x-5}{4}\cdot\frac{d}{dx}\frac{3x-5}{4} = \cos\frac{3x-5}{4}\cdot\frac{3}{4} = \frac{3}{4}\cos\frac{3x-5}{4}\ .$$

問題 3.8.2

$$\frac{dy}{dx} = \frac{d}{dx}\ln(\sin x+3) = \frac{1}{\sin x+3}\frac{d}{dx}(\sin x+3) = \frac{1}{\sin x+3}\cos x = \frac{\cos x}{\sin x+3}\ .$$

問題 3.8.3

$$\frac{d}{dx}\sin^4 x = \frac{d}{dx}(\sin x)^4 = 4(\sin x)^3\frac{d}{dx}\sin x = 4\sin^3 x\cos x\ .$$

問題 3.8.4

$$\frac{dy}{dx} = \frac{d}{dx}\tan^{-1}\sqrt{x} = \frac{1}{1+\sqrt{x}^{\,2}}\frac{d}{dx}\sqrt{x} = \frac{1}{1+x}\frac{d}{dx}x^{\frac{1}{2}} = \frac{1}{1+x}\frac{1}{2}x^{-\frac{1}{2}} = \frac{1}{2\sqrt{x}(1+x)}\ .$$

問題 3.8.5

$$\frac{d}{dt}e^{3-2t} = e^{3-2t}\frac{d}{dx}(3-2t) = -2e^{3-2t}\ .$$

問題 3.8.6

$$\begin{aligned}\frac{dv}{du} &= \frac{d}{du}\sqrt{u^2-4u+5} = \frac{d}{du}(u^2-4u+5)^{\frac{1}{2}}\\ &= \frac{1}{2}(u^2-4u+5)^{-\frac{1}{2}}\frac{d}{du}(u^2-4u+5) = \frac{1}{2\sqrt{u^2-4u+5}}(2u-4)\\ &= \frac{u-2}{\sqrt{u^2-4u+5}}\ .\end{aligned}$$

問題 3.8.7

$$\begin{aligned}g'(x) &= \frac{d}{dx}\{e^x\cos(3x+1)\} = \frac{d}{dx}e^x\cdot\cos(3x+1) + e^x\frac{d}{dx}\cos(3x+1)\\ &= e^x\cos(3x+1) + e^x\{-\sin(3x+1)\}\frac{d}{dx}(3x+1) = e^x\cos(3x+1) + e^x\{-\sin(3x+1)\}3\\ &= e^x\{\cos(3x+1) - 3\sin(3x+1)\}\ .\end{aligned}$$

問題 3.8.8

$$\begin{aligned}\frac{dx}{dt} &= \frac{d}{dt}\frac{\sin t}{e^{3t-5}} = \frac{\frac{d}{dt}\sin t\cdot e^{3t-5} - \sin t\cdot\frac{d}{dt}e^{3t-5}}{(e^{3t-5})^2}\\ &= \frac{\cos t\cdot e^{3t-5} - \sin t\cdot e^{3t-5}\frac{d}{dt}(3t-5)}{(e^{3t-5})^2} = \frac{\cos t - \sin t\cdot 3}{e^{3t-5}}\\ &= \frac{\cos t - 3\sin t}{e^{3t-5}}\ .\end{aligned}$$