

# Solutions

$$\textcircled{1} \quad f(x) = x^2 \cdot \sin(x)$$

$$f'(x) = x^2 \cdot \cos(x) + 2x \cdot \sin(x)$$

$$\textcircled{3} \quad f(x) = e^x \cdot \cos(x)$$

$$\begin{aligned} f'(x) &= e^x \cdot (-\sin x) + e^x \cdot \cos(x) \\ &= e^x(-\sin x + \cos x) \end{aligned}$$

$$\textcircled{5} \quad y = \sec x \cdot \tan x$$

$$\begin{aligned} y' &= \sec x \sec^2 x + \sec x \cdot \tan x \cdot \tan x \\ &= \sec^3 x + \sec x \cdot \tan^2 x \end{aligned}$$

$$1. \quad f(x) = x^2 \sin x$$

$$3. \quad f(x) = e^x \cos x$$

$$5. \quad y = \sec \theta \tan \theta$$

$$7. \quad y = c \cos t + t^2 \sin t$$

$$9. \quad y = \frac{x}{2 - \tan x}$$

$$11. \quad f(\theta) = \frac{\sin \theta}{1 + \cos \theta}$$

$$13. \quad y = \frac{t \sin t}{1 + t}$$

$$15. \quad f(\theta) = \theta \cos \theta \sin \theta$$

$$\textcircled{7} \quad y = c \cdot \cos t + t^2 \sin t$$

$$\begin{aligned} y' &= -c \sin t + t^2 \cdot \cos t + 2t \cdot \sin t \\ &= -c \sin t + t^2 \cos t + 2t \sin t \\ &= (2t - c) \sin t + t^2 \cos t \end{aligned}$$

$$\textcircled{9} \quad y = \frac{x}{2 - \tan x}$$

$$\begin{aligned} y' &= \frac{(2 - \tan x) \cdot (1) - (x)(-\sec^2 x)}{(2 - \tan x)^2} \\ &= \frac{2 - \tan x + \sec^2 x}{(2 - \tan x)^2} \end{aligned}$$

$$\textcircled{11} \quad f(\theta) = \frac{\sin \theta}{1 + \cos \theta}$$

$$f'(\theta) = \frac{(1 + \cos \theta)(\cos \theta) - (\sin \theta)(-\sin \theta)}{(1 + \cos \theta)^2}$$

$$= \frac{\cos \theta + \cos^2 \theta + \sin^2 \theta}{(1 + \cos \theta)^2}$$

$$= \frac{\cos \theta + 1}{(1 + \cos \theta)^2} = \frac{(1 + \cos \theta)}{(1 + \cos \theta)^2}$$

$$= \frac{1}{1 + \cos \theta}$$

$$\textcircled{13} \quad y = \frac{t \cdot \sin t}{1 + t}$$

$$\frac{(1+t)[t \cdot \cos t + (1) \cdot \sin t] - (t \cdot \sin t)(1)}{(1+t)^2}$$

$$= \frac{(1+t)[t \cos t + \sin t] - t \sin t}{(1+t)^2}$$

$$\frac{t \cos t + \sin t + t^2 \cos t + t \sin t - t \sin t}{(1+t)^2} = \frac{t \cos t + \sin t + t^2 \cos t}{(1+t)^2}$$