

$$\begin{aligned}(2) \quad (x \sin x)^{(n)} &= (\sin x \cdot x)^{(n)} \\&= (\sin x)^{(n)} x + {}_n C_1 (\sin x)^{(n-1)} x' + \cdots + \sin x \cdot x^{(n)} \\&= (\sin x)^{(n)} x + {}_n C_1 (\sin x)^{(n-1)} x' \\&= x \sin (x + n\pi/2) + n \sin (x + (n-1)\pi/2)\end{aligned}$$