2. No

4. Yes

6. Yes

16. $(x+xy^2)\,dx + e^{x^2} y\,dy = 0$

$x(y^2+1)\,dx + y e^{x^2} dy = 0$

$\therefore \frac{y}{y^2+1}\,dy = -x e^{-x^2} dx$

$\therefore \int \frac{y}{y^2+1}\,dy = -\int x e^{-x^2} dx$

$\frac{1}{2}\ln(y^2+1) = \frac{1}{2} e^{-x^2} + C_1$

$\ln(y^2+1) = e^{-x^2} + C_2$

$y^2+1 = C e^{e^{-x^2}} \quad (C>0)$

$\therefore y = \pm\sqrt{C e^{e^{-x^2}} - 1}\,, \quad C>0$

14. $y = \tan(x^3 + C)$

23. $\frac{dy}{dx} = 2x\cos^2 y$

$\frac{dy}{\cos^2 y} = 2x\,dx$

$\therefore \int \sec^2 y\,dy = \int 2x\,dx$

$\therefore \tan y = x^2 + C$

$y(0) = \frac{\pi}{4} \rightarrow \tan\frac{\pi}{4} = C$

$\therefore C = 1$

$\therefore \tan y = x^2 + 1$

or $y = \tan^{-1}(x^2+1)$