ODE number: 1

$$\frac{d}{dx}y(x) = \sin\left(x - y(x)\right)$$

Solution:

$$y(x) = x - 2\,\mathrm{atan}\left(\frac{C + -x + 2}{C - x}\right)$$

CORRECT
ODE number: 2

$$x^2\frac{d}{dx}y(x) - (x+1)\,y(x) = 2x^4 e^{-\frac{1}{x}}$$

Solution:

$$y(x) = x\left(C + x^2\right)e^{-\frac{1}{x}}$$

CORRECT
ODE number: 3

$$x^2\frac{d}{dx}y(x) + (x\log\left(y(x)\right) + 1)\,y(x) = 0$$

Solution:

$$y(x) = \left(\frac{C}{x}\right)^{\frac{1}{x}}$$

CORRECT
ODE number: 4

$$x^2\frac{d}{dx}y(x) = x^2 + y^2(x)$$

Given solution:

$$y(x) = \frac{x}{2} + \frac{\sqrt{3}}{2}\tan\left(\frac{\sqrt{3}}{2}\log\left(Cx\right)\right)$$

is INCORRECT
The correct one is:

$$y(x) = \frac{2x}{\sqrt{3}\tan\left(\frac{\sqrt{3}}{6}\left(C_1 - \log\left(x^3\right)\right)\right) + 1}$$