

次の常微分方程式の一般解を求めよ.

$$1. \frac{d^2y}{dx^2} - y = xe^{2x} + e^x$$

$$2. \frac{d^2y}{dx^2} + y = \frac{1}{\cos x}$$

$$3. x^2 \left(\frac{dy}{dx}\right)^2 + 3xy \frac{dy}{dx} + 2y^2 = 0$$

$$4. (x + y + 1) \frac{dy}{dx} - 3x + y + 5 = 0$$

$$5. \{y - 2xy \tan(2x)\} dx + x dy = 0$$

$$6. y \frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^2 + 1 = 0$$

$$7. x \frac{d^2y}{dx^2} + \frac{dy}{dx} = 0$$

$$8. y = x \frac{dy}{dx} - \log_e \left(\frac{dy}{dx}\right)$$