Form: $y' + P(x)y = Q(x)$

4. $y' - 5y = 4e^x$

$P(x)$

② I.F.

$\mu(x) = e^{\int P(x)\,dx}$

$= e^{\int -5\,dx}$

$= e^{-5x}$

③ $e^{-5x}(y' - 5y) = e^{-5x}(4e^x)$

④ $\underbrace{e^{-5x}}_{Q}\underbrace{y'}_{P'} \underbrace{- 5e^{-5x}}_{Q'}\underbrace{y}_{P} = 4e^{-4x}$

$\frac{d}{dx}[ye^{-5x}] = 4e^{-4x}$

⑤ $\int \frac{d}{dx}[ye^{-5x}]\,dx = \int 4e^{-4x}\,dx$

$ye^{-5x} = 4\int e^{-4x}\,dx$

$u = -4x \quad du = -4\,dx$

$ye^{-5x} = 4 \cdot \left(-\frac{1}{4}\right)\int -4e^{-4x}\,dx$

$ye^{-5x} = -\int e^u\,du$

$ye^{-5x} = -e^u + C$

$ye^{-5x} = -e^{-4x} + C$

$\frac{ye^{-5x}}{e^{-5x}} = \frac{-e^{-4x}}{e^{-5x}} + \frac{C}{e^{-5x}}$

$y = -\frac{e^{5x}}{e^{4x}} + Ce^{5x}$

$y = -e^x + Ce^{5x}$