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

9. $y' - 1y = 9xe^{9x}$ ($P(x)$)

② I.F.

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

$= e^{\int -1\,dx}$

$= e^{-x}$

③ $e^{-x}(y' - y) = e^{-x}(9xe^{9x})$

④ $\underbrace{e^{-x}}_{Q}\underbrace{y'}_{P'} - \underbrace{e^{-x}}_{Q'}\underbrace{y}_{P} = 9xe^{8x}$

$\frac{d}{dx}[ye^{-x}] = 9xe^{8x}$

⑤ $\int \frac{d}{dx}[ye^{-x}]\,dx = \int (9xe^{8x})\,dx$

"PARTS"

S	D	±
+ →	$9x$	e^{8x}
− →	9	$\frac{1}{8}e^{8x}$
+	0	$\frac{1}{64}e^{8x}$

$ye^{-x} = \frac{9}{8}xe^{8x} - \frac{9}{64}e^{8x} + C$

$\frac{ye^{-x}}{e^{-x}} = \frac{9xe^{8x}}{8e^{-x}} - \frac{9e^{8x}}{64e^{-x}} + \frac{C}{e^{-x}}$

$y = \frac{9xe^{8x}e^{x}}{8} - \frac{9e^{8x}e^{x}}{64} + Ce^{x}$

$$\boxed{y = \frac{9xe^{9x}}{8} - \frac{9e^{9x}}{64} + Ce^{x}}$$