(3) $\boxed{y' - 6y = 5e^{6x}y^4}$ → Ec. Bernoulli

$$y' = 5e^{6x}y^4 + 6y$$

$\alpha = 4$ $\quad z = y^{1-\alpha} \rightarrow z = y^{1-4} \rightarrow \boxed{z = y^{-3}}$

$$\boxed{z' = -3y^{-4} \cdot y' = -3y^{-4} \cdot (5e^{6x}y^4 + 6y) = -15e^{6x} - 18\underbrace{(y^{-3})}_{z}}$$

$$z' = -15e^{6x} - 18z \rightarrow \underbrace{z' + 18z = -15e^{6x}}$$ → Ec. dif. lineal orden 1.

$$z' + 18z = -15e^{6x}$$

→ Ec. dif. homo. asociada → $z' + 18z = 0 \rightarrow z' = -18z \rightarrow \frac{dz}{dx} = -18z \rightarrow \int \frac{dz}{z} = \int -18\,dx$

$$\ln z = -18x + c \rightarrow z = e^{-18x+c} = e^{-18x} + \underbrace{e^{c}}_{K>0} \rightarrow z = k \cdot e^{-18x} \rightarrow \boxed{z = k \cdot e^{-18x}}$$

– Imponemos que z sea solución

$z = k(x) \cdot e^{-18x}$ $\quad$ ¿k(x)?

$$z' = k'(x) \cdot e^{-18x} + k(x) \cdot e^{-18x} \cdot (-18) \rightarrow \boxed{z' = k'(x) \cdot e^{-18x} + k(x) - 18e^{-18x}}$$

→ Sustituimos en la ec. dif

$$k'(x) \cdot e^{-18x} + \cancel{k(x) - 18e^{-18x}} + 18\cancel{k(x)} \cdot e^{-18x} = -15e^{6x}$$

$$k'(x)e^{-18x} = -15e^{6x} \rightarrow k'(x) = \frac{-15e^{6x}}{e^{-18x}} = -15e^{6x+18x} \rightarrow k'(x) = -15e^{24x}$$

$$k(x) = \int -15e^{24x} = \frac{1}{24}(-15)\int e^{24x}(24) = -\frac{5}{8}\int e^{24x} \cdot (24) = -\frac{5}{8}e^{24x} + c, \ C, \in \mathbb{R}$$

$$z = \left(-\frac{5}{8}e^{24x} + c\right) e^{-18x} \rightarrow \boxed{z = -\frac{5}{8}e^{6x} + c(e^{-18x}) \ C, \in \mathbb{R}}$$

$$y^{-3} = -\frac{5}{8}e^{6x} + c(e^{-18x}) \rightarrow \frac{1}{y^3} = -\frac{5}{8}e^{6x} + c(e^{-18x})$$

$$\boxed{y = \sqrt[3]{\frac{1}{-\frac{5}{8}e^{6x} + c(e^{-18x})}} \quad C, \in \mathbb{R}}$$ → Solución ecuación diferencial Bernoulli