Example about Growth/Decay from a textbook:
(A First Course in Differential Equations) by Zill.
Problem # 6 page: 89

100 mg of radioactive substance. After 6 hours, the mass has decreased by 3%. Rate of decay is proportional to the amount of the substance presented at time t, find the amount remaining after 24 hours.

Solution:

$A(t)$ = Present Amount of the Substance at time $t$.

$t$ = # of hours.

$$\frac{dA}{dt} = \alpha A$$

$$A(0) = \boxed{100\ mg}$$

$$A(6) = 100 - \frac{3}{100} \times (100) = \boxed{97\ mg}$$

So, $\frac{dA}{dt} = \frac{\alpha}{A^{-1}}$ "Separable Method"

$$\int A^{-1}\,dA = \int \alpha\,dt$$

$$\int A^{-1}\,dA - \int \alpha\,dt = C$$

$$\ln|A| - \alpha t = C$$

$$\ln|A| = \alpha t + C \Rightarrow A = e^{\alpha t + C} = e^{\alpha t} \cdot e^{C} = Ce^{\alpha t} \Rightarrow \boxed{A = Ce^{\alpha t}}$$

($e^C$: Assume $= C$)

To find $\alpha$ and $C$, we do the following: $A(0) = Ce^{\alpha(0)} = 100$ ($e^{\alpha(0)} = 1$)

$$\Rightarrow \boxed{C = 100}$$

$$A(6) = 100e^{\alpha(6)} = 97 \Rightarrow e^{\alpha(6)} = \frac{97}{100} = 0.97 \Rightarrow \ln e^{\alpha(6)} = \ln(0.97) \Rightarrow 6\alpha = \ln(0.97)$$

$$\Rightarrow \boxed{\alpha = \frac{\ln(0.97)}{6}}.$$