№ - 3

$$e^{-s}\left(1+\frac{ds}{dt}\right)=1$$

$$1+\frac{ds}{dt}=e^{s}$$

$$ds=\left(e^{s}-1\right)dt$$

① $$\frac{ds}{e^{s}-1}=②\,dt$$

① $$\int\frac{ds}{e^{s}-1}=\left\{\begin{matrix}u=e^{s}\\du=u\,ds\end{matrix}\right\}=\int\frac{du}{(u-1)u}=\int\frac{du}{u-1}-$$

$$-\int\frac{du}{u}=\ln(u-1)-\ln(u)=\ln\left(e^{s}-1\right)-s$$