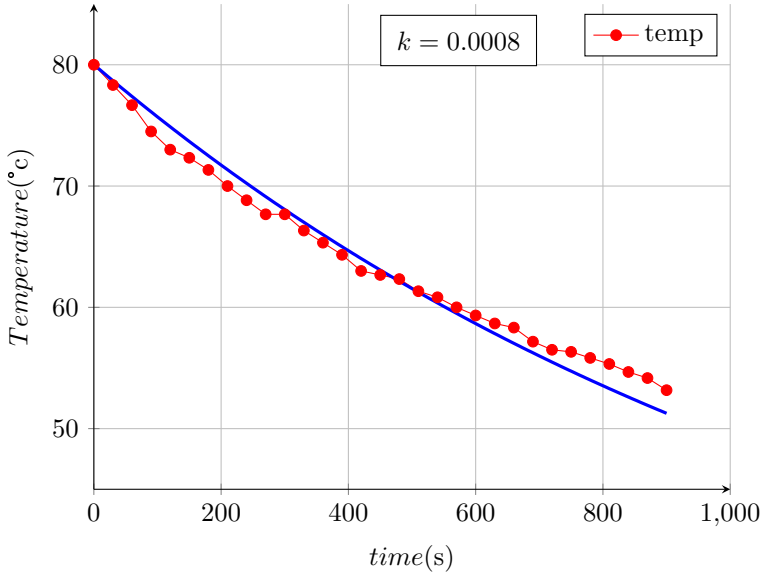
Without adding cold water

$$\boxed{T(t) = S + (T_0 - S)\,\mathrm{e}^{-kt}}$$

- Room Temperature $S = 24°\mathrm{C}$
- Initial Water Temperature $T_i = 80°\mathrm{C}$
- constant $k = 0.0008$
- Water Volume $v = 220ml$



$$T(t) = 24 + (80 - 24)\,\mathrm{e}^{-0.0008t}, \quad R^2 = 0.99$$