Let the moisture content at time \( t \) be \( Q(t) \).

Rate of evaporation (i.e. \( \frac{dQ}{dt} \)) is proportional to current moisture content.

\[
\frac{dQ}{dt} \propto Q
\]

Using a proportionality constant \( k \),

\[
\frac{dQ}{dt} = kQ
\]

Solving this differential equation using separation of variables:

\[
\int \frac{1}{Q} \, dQ = \int k \, dt
\]

\[
\ln |Q| = kt + C
\]

Exponentiating both sides:

\[
|Q| = e^{(kt+C)} = e^C e^{kt}
\]

\[
Q = \pm e^{C} e^{kt} = C e^{kt}
\]

(Renaming \( C, e^C \))
After 1 hour (i.e. $t=1$), 40% moisture is gone. So 60% of moisture is left.

First, let's see how much moisture is there at the beginning ($t=0$).

$$Q(0) = C_1 e^{k(0)} = C_1.$$ We have $C_1$, amount of moisture to begin with, and 60% is left after $t=1$.

$$\frac{60}{100} C_1 = Q(1).$$

Thus, $\frac{60}{100} C_1 = Q(1)$.

Plugging $t=1$ into our formula $Q(t) = C_1 e^{kt}$,

$$\Rightarrow \frac{60}{100} = e^k$$

$$\Rightarrow k = \ln \left( \frac{60}{100} \right) = \ln \left( \frac{6}{10} \right)$$
How long will it take to lose 80%?

Find $t$ such that remaining moisture is 20% of the initial moisture.

\[ Q(t) = \frac{20}{100} C_1 \]

\[ \frac{20}{100} q_1 = C_1 e^{kt} = \frac{1}{5} e^{\ln\left(\frac{6}{10}\right) t} \]

\[ \Rightarrow \frac{1}{5} = e^{\ln\left(\frac{6}{10}\right) t} \]

\[ \ln\left(\frac{1}{5}\right) = \ln\left( e^{\ln\left(\frac{6}{10}\right) t}\right) \]

\[ \Rightarrow \ln\left(\frac{1}{5}\right) = \ln\left(\ln\left(\frac{6}{10}\right) t\right) \]

\[ \Rightarrow t = \frac{\ln\left(\frac{1}{5}\right)}{\ln\left(\frac{6}{10}\right)} \]