sucker $\longrightarrow$ dextrose

$t = 0$: masa sucker = 100 g

masa dextrose = 0 g

Stel $x(t)$ = masa sucker (in g) dat op tijdstip t (min) al is omgezet in dextrose

$$\frac{dx}{dt} \sim (100 - x)$$

$$\frac{dx}{dt} = k \cdot (100 - x)$$

$$\frac{dx}{100 - x} = k \cdot dt$$

$$\int \frac{dx}{100 - x} = \int k \cdot dt$$

$$-\ln(|100 - x|) = k \cdot t + C$$

↳ $100 - x > 0$, dus $|\ldots|$ is overbodig

$$\ln(100 - x) = -k \cdot t - C$$

$$100 - x = e^{-k.t-c}$$

$$100 - x = e^{-k.t} \cdot \underbrace{e^{-c}}_{=K}$$

$$x = 100 - K.e^{-kt}$$

k en K bepalen met:

$(t = 0 \text{ min}, x = 0\,g)$ en $\left(x = 40g, \frac{dx}{dt} = 12\,\frac{g}{\text{min}}\right)$

$$\Downarrow$$

$$0 = 100 - K.\underbrace{e^{0}}_{=1} \Rightarrow K = 100$$

$x = 40, \frac{dx}{dt} = 12$ invullen in $\frac{dx}{dt} = k.(100 - x)$:

$$12 = k.60 \Rightarrow k = \frac{12}{60} = \frac{1}{5} = 0{,}2$$

$$\Rightarrow x(t) = 100 - 100.e^{-0{,}2.t}$$

Zoek nu t waarbij $x = 90$:

$\text{solve}(90 = 100 - 100.e^{-0{,}2.t}, t) \Rightarrow t = 11{,}5129$ min