3.12

1) $m = 2600\,(1 - 0{,}51\,e^{-0{,}075\cdot 0})^3$

$= 2600\,(1 - 0{,}51\,e^{0})^3$

$= 2600\,(1 - 0{,}51 \cdot 1)^3$

$= 2600 \cdot 0{,}49^3$

$\approx 305{,}88$

2) $m = 2600\,(1 - 0{,}51\,e^{-0{,}075t})^3$

$\frac{m}{2600} = (1 - 0{,}51\,e^{-0{,}075t})^3$

$\sqrt[3]{\frac{m}{2600}} = 1 - 0{,}51\,e^{-0{,}075t}$

$0{,}51\,e^{-0{,}075t} = 1 - \sqrt[3]{\frac{m}{2600}}$

$e^{-0{,}075t} = \dfrac{1 - \sqrt[3]{\frac{m}{2600}}}{0{,}51}$

$-0{,}075\,t = \ln\left(\dfrac{1 - \sqrt[3]{\frac{m}{2600}}}{0{,}51}\right)$

$t = -\dfrac{\ln\left(\dfrac{1 - \sqrt[3]{\frac{m}{2600}}}{0{,}51}\right)}{0{,}075} = -\dfrac{\ln\left(\dfrac{1 - \sqrt[3]{\frac{1800}{2600}}}{0{,}51}\right)}{0{,}075} \approx 19{,}82$

3) $\lim\limits_{x\to+\infty} e^{-x} = \lim\limits_{x\to+\infty} \dfrac{1}{e^x} = \dfrac{1}{e^{+\infty}} = \dfrac{1}{+\infty} = 0$

$\lim\limits_{t\to+\infty} 2600\,(1 - 0{,}51\,e^{-0{,}075t})^3 = 2600\,(1 - 0{,}51 \cdot 0)^3 = 2600\,(1)^3 = 2600$