

p 113-114-115

$$\begin{aligned} \textcircled{1} \quad 3^x &= 125 \\ x \log 3 &= \log 125 \\ x &= \frac{\log 125}{\log 3} \\ x &= 4,39 \end{aligned}$$

$$\begin{aligned} \textcircled{3} \quad 4^{2x} &= 15 \\ 2x \log 4 &= \log 15 \\ x &= \frac{\log 15}{2 \log 4} \\ x &= 0,42 \end{aligned}$$

$$\begin{aligned} \textcircled{5} \quad (0,7)^{3x} &= 2,08 \\ 3x \log 0,7 &= \log 2,08 \end{aligned}$$

$$x = \frac{\log 2,08}{3 \log 0,7}$$

$$x = -0,68$$

$$\textcircled{7} \quad 8^{-x/3} = 20$$

$$-\frac{x}{3} \log 8 = \log 20$$

$$-x \log 8 = 3 \log 20$$

$$x = \frac{-3 \log 20}{\log 8}$$

$$x = -4,32$$

$$\begin{aligned} \textcircled{9} \quad 2^{x+3} &= 17^x \\ (x+3) \log 2 &= x \log 17 \\ x \log 2 + 3 \log 2 &= x \log 17 \\ x \log 2 - x \log 17 &= -3 \log 2 \\ x (\log 2 - \log 17) &= -3 \log 2 \\ x &= \frac{-3 \log 2}{\log 2 - \log 17} \end{aligned}$$

$$x = 0,97$$

$$\begin{aligned} \textcircled{11} \quad 21^{2x+5} &= 278^{3x-7} \\ (2x+5) \log 21 &= (3x-7) \log 278 \\ 2x \log 21 + 5 \log 21 &= 3x \log 278 - 7 \log 278 \\ 2x \log 21 - 3x \log 278 &= -5 \log 21 - 7 \log 278 \\ x (2 \log 21 - 3 \log 278) &= -5 \log 21 - 7 \log 278 \end{aligned}$$

$$x = \frac{-5 \log 21 - 7 \log 278}{2 \log 21 - 3 \log 278}$$

$$x = 5,06$$

$$(23) \log x + \log 12 = \log 8$$

$$\log x = \log 8 - \log 12$$

$$\log x = \log \left( \frac{8}{12} \right)$$

$$x = \frac{8}{12} \text{ or } \frac{2}{3}$$

$$(25) 4 \log_5 x = \log_5 625$$

$$\log_5 x^4 = \log_5 625$$

$$x^4 = 625$$

$$x = \sqrt[4]{625}$$

$$x = 5$$

$$(27) M(t) = M_0 (1,01)^{12t}$$

$$2M_0 = M_0 (1,01)^{12t}$$

$$2 = 1,01^{12t}$$

$$\log 2 = 12t \log 1,01$$

$$t = \frac{\log 2}{12 \log 1,01}$$

$$t = 5,8$$

$$10\% \div 12 = 0,01$$

$$n = 12t$$

$$(29) M(t) = M_0 (1,01)^{12t}$$

$$3M_0 = M_0 (1,01)^{12t}$$

$$\log 3 = 12t \log 1,01$$

$$t = \frac{\log 3}{12 \log 1,01}$$

$$t = 9,2$$

$$\textcircled{30} \quad V(t) = V_0 (0,85)^t$$

$$V(t) = 12.500 (0,85)^t$$

$$\textcircled{31} \quad \frac{1}{2}(12.500) = 12.500 (0,85)^t$$

$$\log\left(\frac{1}{2}\right) = t \log 0,85$$

$$t = \frac{\log 0,5}{\log 0,85}$$

$$t = 4,3 \text{ années}$$

$$\textcircled{32} \quad 1500 = 12.500 (0,85)^t$$

$$0,12 = 0,85^t$$

$$t = \frac{\log 0,12}{\log 0,85}$$

$$t = 13,05 \text{ années}$$

$$\textcircled{33} \quad (\log_a x)(\log_a x) = 1$$

45.

a)  $0^{\circ}\text{C} \rightarrow 140$   $\leftarrow$  On peut considérer ceci comme la valeur initiale  
 $25^{\circ}\text{C} \rightarrow 20$

$$t = 140 \left(\frac{1}{2}\right)^{T/d}$$

$T \rightarrow$  température  
 $t \rightarrow$  temps de conservation.

$$\frac{20}{140} = \frac{140 \left(\frac{1}{2}\right)^{25/d}}{140}$$

$$\log \frac{1}{7} = \log \left(\frac{1}{2}\right)^{25/d}$$

$$\log \frac{1}{7} = \frac{25}{d} \log \left(\frac{1}{2}\right)$$

$$\frac{d \log \frac{1}{7}}{\log \frac{1}{7}} = \frac{25 \log \frac{1}{2}}{\log \frac{1}{2}}$$

$$d = 81.9$$

$$t = 140 \left(\frac{1}{2}\right)^{T/81.9}$$

b)

$$t = 140 \left(\frac{1}{2}\right)^{5/81.9}$$

$$t = 94.8 \text{ h.}$$

$$\textcircled{46} \text{ a) } 16,85 = 20 \left(\frac{1}{2}\right)^{2/d}$$

$$0,8425 = \frac{1}{2}$$

$$\log 0,8425 = \frac{2 \log 0,5}{d}$$

$$d = \frac{2 \log 0,5}{\log 0,8425}$$

$$d = 8,09 \text{ jours}$$

La demi-vie de l'iode  $^{131}\text{I}$  est de 8,1 jours

$$\text{b) } 154 = 250 \left(\frac{1}{2}\right)^{32/d}$$

$$0,616 = 0,5^{32/d}$$

$$\log 0,616 = \frac{32 \log 0,5}{d}$$

$$d = \frac{32 \log 0,5}{\log 0,616}$$

$$d = 45,78$$

La demi-vie du phosphore  $^{32}\text{P}$  est de 45,8 jours

$$c) 78,1 = 100 \left(\frac{1}{2}\right)^{4/d}$$

$$0,781 = (0,5)^{4/d}$$

$$\log 0,781 = \frac{1}{d} \log 0,5$$

$$d = \frac{\log 0,5}{\log 0,781}$$

$$d = 2,8$$

La demi-vie du strontium 87 est de 2,8 jours

$$d) 414,6 = 500 \left(\frac{1}{2}\right)^{4/d}$$

$$0,8292 = (0,5)^{4/d}$$

$$\log 0,8292 = \frac{4}{d} \log 0,5$$

$$d = \frac{4 \log 0,5}{\log 0,8292}$$

$$d = 14,8$$

La demi-vie du sodium 24 est de 14,8 heures