Exponentielles et logarithmes

Exercice 1.

a) $7^x = 7^{-2} \quad \Rightarrow \boxed{\mathcal{S} = \{-2\}}$

b) $5^{3x-1} = 5^{2x+4} \quad \Leftrightarrow \quad 3x - 1 = 2x + 4 \quad \Leftrightarrow \quad x = 5 \quad \Rightarrow \boxed{\mathcal{S} = \{5\}}$

c) $x = \log_9(90) \simeq 2.05 \quad \Rightarrow \boxed{\mathcal{S} = \{2.05\}}$

Exercice 2.

a) $f(x) = 600 \cdot 3^{\frac{x}{4}} \quad \Rightarrow \quad f(5) = 600 \cdot 3^{\frac{5}{4}} \simeq \boxed{2368.93 \text{ frs}}$

b) $3'000 = 600 \cdot 3^{\frac{x}{4}} \quad \Leftrightarrow \quad 3^{\frac{x}{4}} = 5 \quad \Leftrightarrow x = 4 \cdot \log_3(5) \simeq 5.86 \quad \Rightarrow \boxed{5 \text{ ans et } 10 \text{ mois}}$

Exercice 3.

a) $C_0 = \dfrac{5'482,80}{1.025^8} \simeq \boxed{4499.99 \text{ frs}}$

b) $\dfrac{t}{100} = \sqrt[7]{\dfrac{272,70}{250}} - 1 \simeq 0.0125 \quad \Rightarrow \boxed{1.25\ \%}$

c) $n = \log_{1.04}\left(\dfrac{144'075,50}{80'000}\right) \simeq \boxed{15 \text{ années}}$

Exercice 4.

a) $\frac{450'000}{2'000'000} = 0.225 \quad \Rightarrow \boxed{P(t) = 2'000'000 \cdot 0.225^{\frac{t}{100}}}$

b) $P(125) = 2'000'000 \cdot 0.225^{\frac{125}{100}} \simeq \boxed{309'926 \text{ chimpanzés}}$

c) $180'000 = 2'000'000 \cdot 0.225^{\frac{t}{100}} \quad \Leftrightarrow 0.09 = 0.225^{\frac{t}{100}} \quad \Leftrightarrow t = 100 \cdot \log_{0.225}(0.09) \simeq 161.43$

$\Rightarrow \boxed{\text{Au premier janvier 2062}}$