Aufgabe 7.1

a) $$n = \frac{\ln\left[1 + \frac{8000}{1000 \cdot 1{,}04} \cdot 0{,}04\right]}{\ln 1{,}04}$$

$$n = 6{,}8$$

d.h. nach sieben Jahren.

b) $$K_{20} = 1000 \cdot 1{,}04 \cdot \frac{1{,}04^{20} - 1}{0{,}04} - 3000 \cdot 1{,}04^{15} + 2000 \cdot 1{,}04^{3}$$

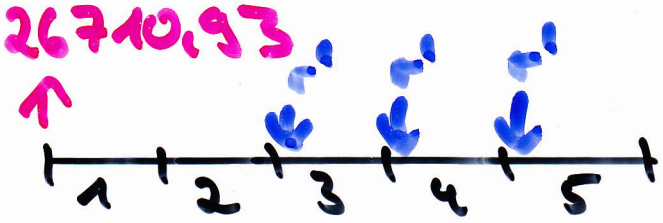
$$K_{20} = 27816{,}10$$

d.h. das Guthaben beträgt 27816,10 GE.

Aufgabe 7.2

a) $R_0 = 6000 \cdot \frac{1{,}04^5 - 1}{0{,}04} \cdot \frac{1}{1{,}04^5} = 26710{,}93$

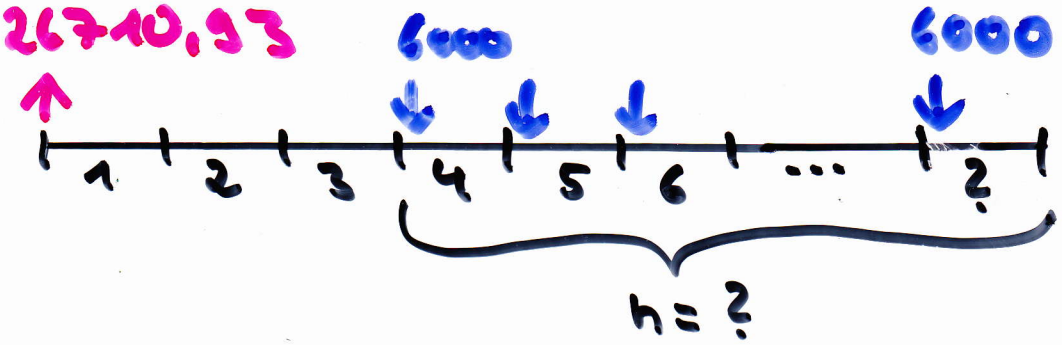
b)




$26710{,}93 \cdot 1{,}04^2 = r' \cdot 1{,}04 \cdot \frac{1{,}04^3 - 1}{0{,}04} \cdot \frac{1}{1{,}04^3}$

$r' = 10010{,}26$

c)




1. $26710{,}93 \cdot 1{,}04^3 = 30046{,}16$

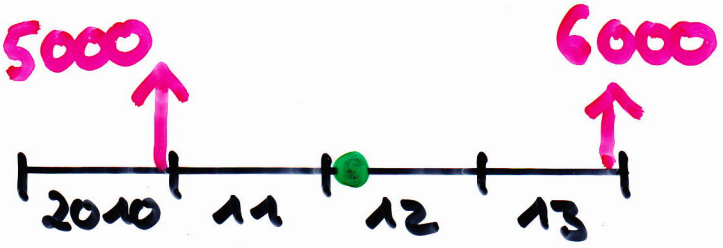
$$n = -\frac{\ln[1 - 30046{,}16 / (6000 \cdot 1{,}04) \cdot 0{,}04]}{\ln 1{,}04}$$

$n = 5{,}4548$

2. $K_5 = 30046{,}16 \cdot 1{,}04^5 - 6000 \cdot 1{,}04 \cdot \frac{1{,}04^5 - 1}{0{,}04}$

$K_5 = 2757{,}90$

Aufgabe 7.3

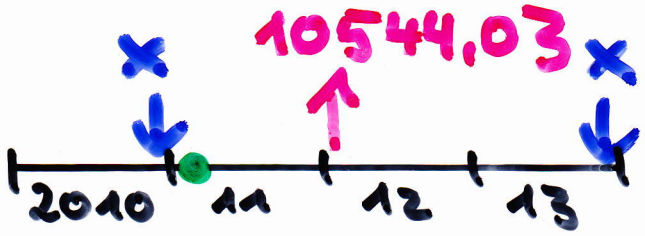



a) $R_0' = 5000 \cdot 1{,}08 + \frac{6000}{1{,}08^2} = 10544{,}03$

$10544{,}03 = r' \cdot 1{,}08 \cdot \frac{1{,}08^6 - 1}{0{,}08} \cdot \frac{1}{1{,}08^6}$

$r' = 2111{,}89$

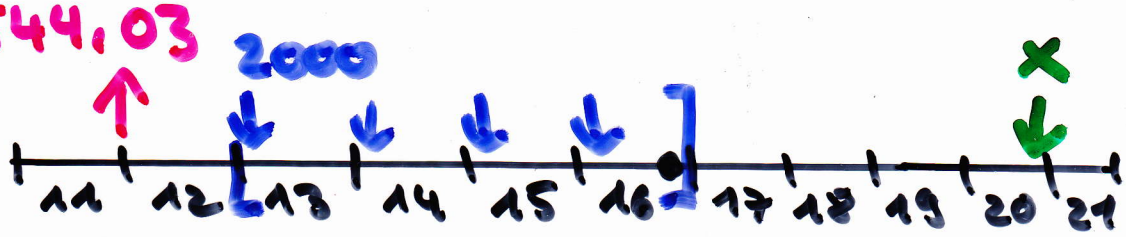
b)




$x + \frac{x}{1{,}08^3} = 10544{,}03 : 1{,}08$

$x = 5442{,}53$

c)




Schulden am 31.12.2016

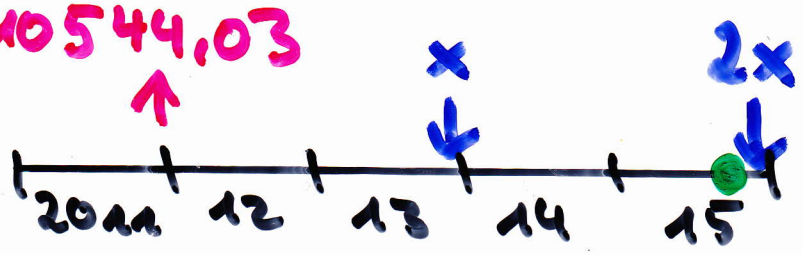
$10544{,}03 \cdot 1{,}08^5 - 2000 \cdot 1{,}08 \cdot \frac{1{,}08^4 - 1}{0{,}08} =$

$5759{,}44$

Schulden am 01.01.2021

$x = 5759{,}44 \cdot 1{,}08^4 = 7835{,}65$

d)




Umstellung am 31.12.2015:

Schulden = Rückzahlungen

$10544{,}03 \cdot 1{,}08^4 = x \cdot 1{,}08^2 + 2x$

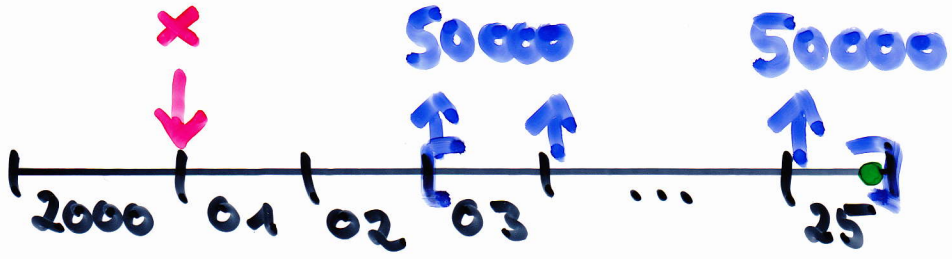
$14345{,}04 = 3{,}1664\,x$

$x = 4530{,}39$

$2x = 9060{,}78$

Aufgabe 7.4

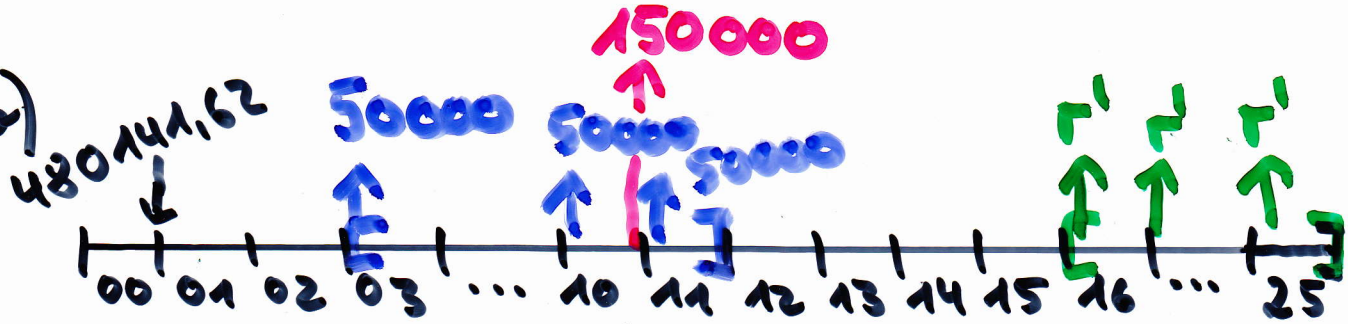
a)




$$x \cdot 1{,}08^{25} = 50000 \cdot 1{,}08 \cdot \frac{1{,}08^{23} - 1}{0{,}08}$$

$$x = 480141{,}62$$

b)




$$k_{11} = 480141{,}62 \cdot 1{,}08^{11} - 50000 \cdot 1{,}08 \cdot \frac{1{,}08^{9} - 1}{0{,}08} - 150000 \cdot 1{,}08 = 283188{,}80$$

$$R_0' = k_{11} \cdot 1{,}08^{4} = 385275{,}24$$

$$385275{,}24 = r' \cdot 1{,}08 \cdot \frac{1{,}08^{10} - 1}{0{,}08} \cdot \frac{1}{1{,}08^{10}}$$

$$r' = 53164{,}23$$