

$$a) \quad x_0 = 118'559.999$$

Ganzzahliger Anteil:

$$\begin{array}{rcl} 118559 & / & 12 = 9879 \text{ r } 11 \\ & / & 12 = 823 \text{ r } 3 \\ & / & 12 = 68 \text{ r } 7 \\ & / & 12 = 5 \text{ r } 8 \\ & / & 12 = 0 \text{ r } 5 \end{array}$$

$$\Rightarrow 3873B$$

Nachkommender Anteil:

$$\begin{array}{rcl} 0.999 \cdot 12 & = & 11 + 0.988 \\ \cdot 12 & = & 11 + 0.856 \\ \cdot 12 & = & 10 + 0.272 \\ \cdot 12 & = & 3 + 0.264 \\ \cdot 12 & = & 3 + 0.168 \\ \cdot 12 & = & 2 + 0.016 \dots \end{array}$$

$$\Rightarrow \tilde{x}_0 = 5873B.BB\dots = \underline{\underline{0.5873B3B \cdot 12^5}}$$

$$\begin{aligned} \tilde{x}_0 &= \overbrace{11 \cdot 12^{-2}}^{42} + \overbrace{11 \cdot 12^{-1}}^{24} + 11 \cdot 12^{-2} + 11 \cdot 12^{-1} + 11 \cdot 12^0 \\ &\quad + 3 \cdot 12^1 + 7 \cdot 12^2 + 8 \cdot 12^3 + 5 \cdot 12^4 \\ &= 118'559.999054888\dots \end{aligned}$$

$$\Rightarrow f_{abs} = |\tilde{x}_0 - x_0| = \underline{\underline{0.0059451\dots}}$$

$$f_{rel} = \frac{|\tilde{x}_0 - x_0|}{|x|} = \underline{\underline{5.014 \cdot 10^{-8}}}$$

$$b) f(x_0) = (118\,559.999)^3 - 1.6665 \cdot 10^{15} \\ = 3.5468 \cdot 10^{10}$$

$$f(\tilde{x}_0) = (118\,559.993054888...) - 1.6665 \cdot 10^{15} \\ = 3.5217 \cdot 10^{10}$$

$$\Rightarrow f_{rel} = \frac{3.5468 - 3.5217}{3.5468} = \underline{\underline{0.0071}}$$

$$c) \kappa = \frac{|f'(\tilde{x}_0)| \cdot |\tilde{x}_0|}{|f(\tilde{x}_0)|}$$

$$f'(x) = 3x^2 \Rightarrow \kappa = \frac{|3x^2| \cdot |x|}{|x^3 - 1.6665 \cdot 10^{15}|} = 5$$

\Rightarrow keine realistische Einschätzung.