Aufgabe 3

a) $\dfrac{5}{\sqrt[3]{2x^2}} = \dfrac{5}{(2x^2)^{1/3}} = 5 \cdot (2x^2)^{-\frac{1}{3}} = 5 \cdot 2^{-\frac{1}{3}} \cdot x^{2 \cdot -\frac{1}{3}} = 5 \cdot 2^{-\frac{1}{3}} \cdot x^{-\frac{2}{3}}$

$f(x) = c \cdot a^x \quad \rightarrow \quad y = \log(f(x)) = \log(c \cdot a^x) = \log(c) + x \cdot \log(a)$

i) $f(x) = c \cdot a^x$

$\rightarrow \quad c = 5 \cdot 2^{-\frac{1}{3}} \qquad a = -\frac{2}{3}$

$\log(5) + -\frac{1}{3}(\log(2) + \log(x))$

$\underline{\underline{m = -\frac{2}{3}}} \qquad \underline{\underline{b = \log(5) - \frac{1}{3}\log(2)}}$

ii) $f(x) = c \cdot a^x$

$10^5 \cdot 2e^{-\frac{x}{100}} = 5 \cdot \log(10) + \left(-\frac{x}{100}(\log(2e))\right) = 5 \cdot \log(10) + \left(-\frac{x}{100}(\log(2) + 1)\right)$

$m = -\frac{1}{100}(\log(2) + 1) \qquad b = 5 \cdot \log(10)$

iii) $f(x) = c \cdot a^x$

$\left(\dfrac{10^{2x}}{2^{5x}}\right)^2 = \dfrac{10^{4x}}{2^{10x}}$

$\log(n(x)) = \log\left(\dfrac{10^{4x}}{2^{10x}}\right) \quad \rightarrow \quad \log\left(\dfrac{a}{b}\right) = \log(a) - \log(b)$

$= \log(10^{4x}) - \log(2^{10x})$

$= 4x \cdot \log(10) - 10x \cdot \log(2)$

$= x(4 \cdot \log(10) - 10 \cdot \log(2)$

$\underline{\underline{m = 4\log(10) - 10\log(2)}} \qquad \underline{\underline{b = 0}}$