Level 1 – Grundlagen – Blatt 2

Lösung A1

a) $log_4(1) = 0$, denn $4^0 = 1$.
b) $log_{10}(10)^6 = 6$, denn $10^6 = 10^6$.
c) $log_3(3^5) = 5$, denn $3^5 = 3^5$.
d) $log_{\sqrt{5}}(5) = 2$, denn $\sqrt{5}^2 = 5$.
e) $log_{\sqrt{3}}(27) = 6$, denn $\sqrt{3}^6 = 27$.
f) $log_2(32) = 5$, denn $2^5 = 32$.
g) $log_5(625) = 4$, denn $5^4 = 625$.
h) $log_2(128) = 7$, denn $2^7 = 128$.
i) $log_3(81) = 4$, denn $3^4 = 81$.
j) $log_7(7) = 1$, denn $7^1 = 7$.
k) $log_{0,2}(0{,}04) = 2$, denn $0{,}2^2 = 0{,}04$.
l) $log_{\frac{1}{2}}\left(\frac{1}{16}\right) = 4$, denn $\left(\frac{1}{2}\right)^4 = \frac{1}{16}$.

Lösung A2

a) $log_{0,75}\left(\left(\frac{3}{4}\right)^5\right) = 5$, denn $0{,}75^5 = \left(\frac{3}{4}\right)^5$.
b) $log_6(1) = 0$, denn $6^0 = 1$.
c) $log_{\frac{2}{5}}(0{,}0256) = 4$, denn $\left(\frac{2}{5}\right)^4 = \left(\frac{16}{625}\right) = 0{,}256$.
d) $log_3(3^{12}) = 12$, denn $3^{12} = 3^{12}$.
e) $log_{\frac{1}{3}}(3^{-12}) = 12$, denn $\left(\frac{1}{3}\right)^{12} = 3^{-12}$.
f) $log_{\sqrt{7}}(49) = 4$, denn $\sqrt{7^4} = 7^2 = 49$.
g) $log_{\sqrt{\frac{1}{2}}}\left(\frac{1}{8}\right) = 6$, denn $\sqrt{\left(\frac{1}{2}\right)^6} = \left(\frac{1}{2}\right)^3 = \frac{1}{8}$.
h) $log_{10}(0{,}01) = -2$, denn $10^{-2} = \frac{1}{10^2} = 0{,}01$.
i) $log_2\left(\frac{1}{8}\right) = -3$, denn $2^{-3} = \frac{1}{2^3} = \frac{1}{8}$.
j) $log_{\frac{1}{2}}(16) = -4$, denn $\left(\frac{1}{2}\right)^{-4} = 2^4 = 16$.
k) $log_3\left(\frac{1}{3}\right) = -1$, denn $3^{-1} = \frac{1}{3}$.
l) $log_5\left(\frac{1}{25}\right) = -2$, denn $5^{-2} = \frac{1}{5^2} = \frac{1}{25}$.

Lösung A3

a) $log_5(0{,}04) = -2$, denn $5^{-2} = \frac{1}{5^2} = \frac{1}{25} = \frac{4}{100} = 0{,}04$.

b) $log_{\frac{1}{3}}(81) = -4$, denn $\left(\frac{1}{3}\right)^{-4} = 3^4 = 81$.

c) $log_{0{,}5}(256) = -7$, denn $0{,}5^{-7} = \left(\frac{1}{2}\right)^{-7} = 2^7 = 256$.

d) $log_{0{,}1}(100) = -2$, denn $0{,}1^{-2} = \left(\frac{1}{10}\right)^{-2} = 10^2 = 100$.

e) $log_{\frac{1}{2}}(8) = -3$, denn $\left(\frac{1}{2}\right)^{-3} = 2^3 = 8$.

f) $log_{\frac{1}{5}}(25) = -2$, denn $\left(\frac{1}{5}\right)^{-2} = 5^2 = 25$.

g) $log_{0{,}2}(125) = -3$, denn $0{,}2^{-3} = \left(\frac{2}{10}\right)^{-3} = \left(\frac{1}{5}\right)^{-3} = 5^3 = 125$.

h) $log_4(2) = \frac{1}{2}$, denn $4^{\frac{1}{2}} = \sqrt{4} = 2$.

i) $log_{27}(3) = \frac{1}{3}$, denn $27^{\frac{1}{3}} = \sqrt[3]{27} = 3$.

j) $log_{32}(2) = \frac{1}{5}$, denn $32^{\frac{1}{5}} = \sqrt[5]{32} = 2$.

k) $log_4(\sqrt{2}) = \frac{1}{4}$, denn $4^{\frac{1}{4}} = \left(4^{\frac{1}{2}}\right)^{\frac{1}{2}} = \sqrt{\sqrt{4}} = \sqrt{2}$.

l) $log_2(\sqrt{2}) = \frac{1}{2}$, denn $2^{\frac{1}{2}} = \sqrt{2}$.