

9.4 Určete logaritmy výrazů:

- a) $2\pi r$; $[\log 2 + \log \pi + \log r]$
 b) $r_1^2 - r_2^2$; $[\log (r_1 - r_2) + \log (r_1 + r_2)]$
 c) $\pi r^2 - 2r$; $[\log r + \log (\pi r - 2)]$
 d) $\frac{5}{a}$; $[\log 5 - \log a]$
 e) $\frac{4mn}{5a}$; $[\log 4 + \log m + \log n - \log 5 - \log a]$
 f) $\frac{a^2 - b^2}{2a}$; $[\log (a + b) + \log (a - b) - \log 2 - \log a]$
 g) πd ; $[\log \pi + \log d]$
 h) $12b(a - b)$; $[\log 12 + \log b + \log (a - b)]$
 i) $18\pi r^3 - 2\pi r$; $[\log 2 + \log \pi + \log r + \log (3r - 1) + \log (3r + 1)]$
 j) $\frac{a}{5}$; $[\log a - \log 5]$
 k) $\frac{1}{8ab}$; $[-(\log 8 + \log a + \log b)]$
 l) ab ; $[\log a + \log b]$
 m) $16ab - 4ac$; $[\log 4 + \log a + \log (4b - c)]$
 n) $\pi r(r_1^2 - r_2^2)$; $[\log \pi + \log r + \log (r_1 - r_2) + \log (r_1 + r_2)]$
 o) $\frac{2ab}{3}$; $[\log 2 + \log a + \log b - \log 3]$
 p) $\frac{2(a - b)}{3}$; $[\log 2 + \log (a - b) - \log 3]$

9.5 Určete logaritmy výrazů:

- a) n^3 ; $[3 \log n]$
 b) $a^2 v$; $[2 \log a + \log v]$
 c) $\frac{4}{3} \pi r^3$; $[\log 4 + \log \pi + 3 \log r - \log 3]$
 d) $\frac{\pi d^2 v}{4}$; $[\log \pi + 2 \log d + \log v - \log 4]$

- e) \sqrt{a} ; $\left[\frac{1}{2} \log a\right]$
- f) πr^2 ; $[\log \pi + 2 \log r]$
- g) $2\pi^2(a + b)R$; $[\log 2 + 2 \log \pi + \log(a + b) + \log R]$
- h) $\frac{\pi d^2}{4}$; $[\log \pi + 2 \log d - \log 4]$
- i) $\left(\frac{2a^2}{c^3}\right)^2$; $[2(\log 2 + 2 \log a - 3 \log c)]$
- j) $r \sqrt{2}$; $\left[\log r + \frac{1}{2} \log 2\right]$
- k) $a^3 b^4$; $[3 \log a + 4 \log b]$
- l) $2\pi^2 abR$; $[\log 2 + 2 \log \pi + \log a + \log b + \log R]$
- m) $\left(\frac{r_1 r_2}{2}\right)^2$; $[2(\log r_1 + \log r_2 - \log 2)]$
- n) $\left(\frac{3a^{-2}b^3}{c^{-4}}\right)^5$; $[5(\log 3 - 2 \log a + 3 \log b + 4 \log c)]$
- o) $\sqrt[m]{m^s}$; $\left[\frac{1}{r} s \cdot \log m\right]$
- p) $\sqrt[3]{a^3} \cdot \sqrt[3]{b}$; $\left[\frac{3}{2} \log a + \frac{1}{3} \log b\right]$
- r) $a^{\frac{1}{3}} \cdot \frac{\sqrt[3]{b}}{\sqrt[3]{4}}$; $\left[\frac{1}{3} \log a + \frac{1}{2} \log b - \frac{1}{5} \log 4\right]$
- s) $a^2 \sqrt{b}$; $\left[2 \log a + \frac{1}{2} \log b\right]$
- t) $\frac{2 \sqrt[3]{3}}{3^2 \sqrt[3]{b}}$; $\left[\log 2 - \frac{3}{2} \log 3 - \frac{1}{2} \log b\right]$
- u) $\frac{2}{\sqrt[3]{3}}$; $\left[\log 2 - \frac{1}{3} \log 3\right]$
- v) $\frac{2 \sqrt[3]{2}}{3 \sqrt[3]{3}}$; $\left[\frac{3}{2} \log 2 - \frac{4}{3} \log 3\right]$
- w) $\sqrt[3]{a^2}$; $\left[\frac{2}{3} \log a\right]$

9.6 Určete logaritmy výrazů:

a) $\sqrt[3]{a^3 b}$; $\left[\frac{1}{2} (3 \log a + \log b) \right]$

b) $\sqrt{s(s-a) \cdot (s-b) \cdot (s-c)}$; $\left[\frac{1}{2} [\log s + \log (s-a) + \log (s-b) + \log (s-c)] \right]$

c) $\sqrt[3]{a^2 \sqrt{a}}$; $\left[\frac{5}{6} \log a \right]$

d) $\sqrt{\frac{18}{\sqrt{3}}}$; $\left[\frac{1}{2} \left(\log 18 - \frac{1}{2} \log 3 \right) = \frac{1}{2} \left(\log 2 + \frac{3}{2} \log 3 \right) \right]$

e) $\pi^{0,321}$; $[0,321 \cdot \log \pi]$

f) $\sqrt[3]{ab^2}$; $\left[\frac{1}{3} (\log a + 2 \log b) \right]$

g) $\sqrt[5]{2 \cdot \sqrt[3]{7}}$; $\left[\frac{1}{5} \left(\log 2 + \frac{1}{3} \log 7 \right) \right]$

h) $\sqrt{\frac{\sqrt[3]{4}}{2\sqrt{2}}}$; $\left[-\frac{5}{12} \log 2 \right]$

i) π^e ; $[e \cdot \log \pi]$

j) $\sqrt[4]{abc}$; $\left[\frac{1}{4} (\log a + \log b + \log c) \right]$

k) $3a \sqrt[3]{b^2 c}$; $\left[\log 3 + \log a + \frac{1}{3} (2 \log b + \log c) \right]$

l) $\sqrt[3]{\frac{1}{2a}}$; $\left[-\frac{1}{3} (\log 2 + \log a) \right]$

m) a^π ; $[\pi \cdot \log a]$

n) e^π ; $[\pi \log e]$

9.7

Určete logaritmy výrazů:

$$\text{a) } T = T_i \varrho^{n-1}; \quad [\log T = \log T_i + (n-1) \log \varrho]$$

$$\text{b) } d = 0,74 \sqrt[3]{\frac{V}{\tau}}; \quad \left[\log d = \log 0,74 + \frac{1}{3} (\log V - \log \tau) \right]$$

$$\text{c) } W = \sqrt{\frac{2g}{\gamma} (p_1 - a_2)}; \quad \left[\log W = \frac{1}{2} [\log 2 + \log g - \log \gamma + \log (p_1 - a_2)] \right]$$

$$\text{d) } T = 2\pi \sqrt{\frac{l}{2g}}; \quad \left[\log T = \log 2 + \log \pi + \frac{1}{2} (\log l - \log 2 - \log g) \right]$$

$$\text{e) } T = \frac{2\pi}{\sqrt{g}} \sqrt[4]{l^2 - r^2}; \quad \left[\log T = \log 2 + \log \pi - \frac{1}{2} \log g + \right. \\ \left. + \frac{1}{4} [\log (l - r) + \log (l + r)] \right]$$

$$\text{f) } N = \frac{\varrho}{2} CS \frac{V^3}{3,6^2} \cdot \frac{1}{75}; \quad [\log N = \log \varrho - \log 2 + \log C + \\ + \log S + 3 \log V - 2 \log 3,6 - \log 75]$$

$$\text{g) } D = 0,74 \sqrt[3]{V \tau^2}; \quad \left[\log D = \log 0,74 + \frac{1}{3} (\log V + 2 \log \tau) \right]$$

$$\text{h) } \Delta l = \frac{v}{2} \sqrt{\frac{g_1 g_2}{c \cdot g (g_1 + g_2)}}; \quad \left[\log \Delta l = \log v - \log 2 + \right. \\ \left. + \frac{1}{2} [\log g_1 + \log g_2 - \log c - \log g - \log (g_1 + g_2)] \right]$$

$$\text{i) } u = r \sqrt{\frac{g}{\sqrt{t^2 - r^2}}}; \quad \left[\log u = \log r + \frac{1}{2} \left\{ \log g - \frac{1}{2} [\log (t - r) + \log (t + r)] \right\} \right]$$

$$g) \frac{1}{4} \log x + \log (\log y);$$

$$[\sqrt[4]{x} \log y]$$

$$h) a \cdot \log b - b(\log a + \log b);$$

$$\left[\frac{b^a}{(ab)^b} \right]$$

$$i) \frac{1}{2} \left[\log 2 + \frac{1}{2} \left(\log 2 + \frac{1}{2} \log 2 \right) \right]$$

$$[\sqrt{2} \sqrt{2} \sqrt{2}]$$

9.9 Určete číslo, jehož logaritmováním vznikl výraz:

$$a) 2 + \log_z a;$$

$$[z^2 a]$$

$$b) \frac{1}{\sqrt{2}} - \log_z a;$$

$$\left[\frac{\sqrt{z}}{a} \right]$$

$$c) \log_z (m + 1) + \log_z (m - 1);$$

$$[m^2 - 1]$$

$$d) \log_z (u + 2) + \log_z (u - 1);$$

$$[u^2 + u - 2]$$

$$e) \log_z a + \log_z \left(1 + \frac{b}{a} \right)$$

$$\left[a \left(1 + \frac{b}{a} \right) = a + b \right]$$