

NALOGE ZA 3. LETNIK - LOGARITEMSKA FUNKCIJA

Naloge¹ so namenjene utrjevanju učne snovi in pripravi na preverjanje in ocenjevanje znanja.

1. Z uporabo definicije logaritma reši naslednje logaritemske enačbe:

- | | | |
|---|---|---|
| a) $\log_2 16 = x$, [R:4] | g) $\log_3 x = 2$, [R:9] | m) $\log_x 16 = 2$, [R:4] |
| b) $\log_{\frac{1}{2}} \frac{1}{4} = x$, [R:2] | h) $\log_{0,2} x = -3$, [R:125] | n) $\log_x \frac{5}{4} = -1$, [R: $\frac{4}{5}$] |
| c) $\log_{10} 100 = x$, [R:2] | i) $\log_{10} x = -2$, [R:0, 01] | o) $\log_x 0,001 = -3$, [R:10] |
| d) $\log_{25} 0,2 = x$, [R: $-\frac{1}{2}$] | j) $\log_9 x = \frac{3}{2}$, [R:27] | p) $\log_x 9 = -\frac{2}{3}$, [R: $\frac{1}{27}$] |
| e) $\log_{\frac{1}{8}} 16 = x$, [R: $-\frac{4}{3}$] | k) $\log_9 x = -\frac{3}{2}$, [R: $\frac{1}{27}$] | r) $\log_x 16 = \frac{4}{3}$, [R:8] |
| f) $\log_9 27 = x$, [R: $\frac{3}{2}$] | l) $\log_{125} x = \frac{1}{3}$, [R:5] | s) $\log_x 27 = \frac{3}{4}$, [R:81] |

2. Z uporabo definicije logaritma reši naslednje logaritemske enačbe:

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|---|---|--|
| a) $\log_2 x = 1$, [R:2] | g) $\log_{25} \sqrt{5} = x$, [R: $\frac{1}{4}$] | m) $\log_{27} \frac{1}{81} = x$, [R: $-\frac{4}{3}$] |
| b) $\log_{0,008} 125 = x$, [R:-1] | h) $\log_{16} x = 0,5$, [R:4] | n) $\log_{0,25}(x^2 + 7x) = -1,5$, [R:1; -8] |
| c) $\log_4 16 = x$, [R:2] | i) $\log_x 8 = 0,75$, [R:16] | o) $\log_{0,5} 0,25 = x^2 + 3x - 8$, [R:2; -5] |
| d) $\log_{\frac{1}{3}} x = 2$, [R: $\frac{1}{9}$] | j) $\log_3 0, \bar{3} = x$, [R:-1] | p) $\log_{(x+1)} 4 = 2$, [R:1; -3] |
| e) $\log_3 x = -2$, [R: $\frac{1}{9}$] | k) $\log_{\frac{1}{27}} x = -\frac{1}{3}$, [R:3] | r) $\log_{125}(x + 1) = 0, \bar{6}$, [R:24] |
| f) $\log_x 4 = -2$, [R: $\frac{1}{2}$] | l) $\log_x 0,01 = 2$, [R:0, 1] | s) $\log_x(\frac{8}{27}) = -\frac{3}{4}$, [R: $\frac{81}{16}$] |

3. Reši eksponentne enačbe:

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|---|---|---|
| a) $16^{\log x} = 0,25$, [R: $10^{-\frac{1}{2}}$] | b) $9^{\log x} = \frac{1}{3}$, [R: $10^{-\frac{1}{2}}$] | c) $125^{\log x} = \frac{1}{5}$, [R: $10^{-\frac{1}{3}}$] |
|---|---|---|

4. Izračunaj brez uporabe kalkulatorja:

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|---|----------|
| (a) $3 \cdot \log_5 25 + 2 \cdot \log_3 27 - 4 \cdot \log_2 8 =$ | [R:0] |
| (b) $\log_3 81 \cdot \log_3 27^{-1} \cdot \log_2 16 \cdot \log_2 8$ | [R:-144] |

¹Pripravila Vera Orešnik, prof.

5. Logaritmiraj izraze:

(a) $x = \frac{a^2b}{c^3}$

(b) $y = \frac{a^3b^2}{6}$

(c) $V = \frac{4\pi r^3}{3}$

(d) $x = \frac{a^3b}{\sqrt[5]{c^3d}}$

(e) $y = \sqrt{\frac{3m^4}{n^3o^2}}$

(f) $r = \sqrt[3]{\frac{3V}{4\pi}}$

(g) $y = \left(\frac{\sqrt{3}b}{4a^2}\right)^3$

(h) $y = \frac{a^2 - b^2}{a^2b^2}$

(i) $x = \frac{a^2b - ab^2}{\sqrt{ab}}$

(j) $y = \frac{b}{\sqrt[3]{a^2 - ab}}$

6. Izračunaj x v naslednjih enačbah:

(a) $\log x = 2 \cdot \log a + \frac{1}{2} \log b - \frac{2}{3} \log c$

(b) $\log x = \log a + \log(a + b) - 2 \log(a - b)$

(c) $\log x = \log(a - b) + \log(a + b) - 2(\log a + \log b)$

(d) $\log x = 3(\log a + \log b) + \frac{1}{2} \log(a - b)$

(e) $\log x = \frac{1}{5}(2 \cdot \log a - \frac{1}{2}(\log c - \log(a - b)))$

(f) $\log x = \log(a - 1) - 2 \cdot \log a + \frac{3}{2}(\log a - 5 \cdot \log b + \frac{4}{3} \log c)$

7. Reši eksponentne enačbe z logaritmiranjem:

a) $2^x = 5, \left[R : \frac{\log 5}{\log 2} \right]$

b) $3^{x-1} = 10, \left[R : \frac{1}{\log 3} + 1 \right]$

c) $9^x = 30, \left[R : \frac{\log 30}{\log 9} \right]$

d) $4^{2x} = 52, \left[R : \frac{\log 52}{2 \log 4} \right]$

f) $2^{\ln x} = \log_2 x, \left[R : -\frac{\log 12}{\log 0,25} - 1 \right]$

8. Reši enačbe:

(a) $\log(x+2) + \log(x-5) = 2 \cdot \log(x-2)$ [R:14]

(b) $\log(x+3) - \log(x-2) = \log(x+5) - \log(x-4)$ [R:0]

(c) $\log 5 + \log x - \log(x+1) = \log 3$ [R:1, 5]

9. Reši enačbe:

(a) $\log_x(x^2 + 3x - 12) = 2$ [R:4]

(b) $\log_{x^2-8}(x-2) = \frac{1}{2}$ [R:0]

(c) $\frac{\log_4 x^3 - 3}{\log_4 \sqrt{x}} = 2$ [R:8]

(d) $\frac{\log_3 x^2 - 6}{\log_3 \sqrt{x}} = 2$ [R:3⁶]

10. Reši enačbe:

(a) $\log(x+1) = 0$ [R:0]

(b) $\log(2x-3) = 2$ [R: $\frac{103}{2}$]

(c) $\log(x - \frac{8}{9}) = 2 \log(\frac{1}{6})$ [R: $\frac{11}{12}$]

(d) $\log x + \log(x+3) = \log(x-1) + \log(x+2)$ [R:0]

(e) $\log(2x+3) + \log(3x-1) = \log x + \log(6x+4)$ [R:1]

(f) $\log 2 + 2 \log(x+1) = \log(2x^2 + 4x + 2)$ [R: $x > -1$]

(g) $\log(x+4) + \log(x-4) = \log 6x$ [R:8]

(h) $\log(x+1) + \log(x+2) = 2 \log(2-x)$ [R: $\frac{2}{7}$]

11. Reši enačbe:

(a) $\log(6x-6) - \log(19x-12) = \log 15 - 2$ [R: $\frac{4}{3}$]

(b) $\log(51-4x) - \log(1-2x) = 2$ [R: $\frac{1}{4}$]

(c) $\log(2-x) + 2 \log \sqrt{x} = 0$ [R:1]

(d) $\log(x+1) - \log \sqrt[6]{(x+1)} = 5$ [R:999999]

(e) $\log_4(x+9) = 3 - \log_4(x-3)$ [R:7]

$$(f) \log \sqrt{x+2} + \log \sqrt{x+4} = 0 \quad [\mathbf{R}: -3 + \sqrt{2}]$$

$$(g) \log \sqrt{x-1} - \log \sqrt{2x-3} = \log \sqrt{2x+3} - \log \sqrt{x+1} \quad [\mathbf{R}: \frac{2\sqrt{6}}{3}]$$

$$(h) \log(x-9) + 2 \log \sqrt{2x+1} = 2 \quad [\mathbf{R}: 13]$$

$$(i) \log \sqrt{x-5} + \log \sqrt{2x-3} + 1 = \log 30 \quad [\mathbf{R}: 6]$$

$$(j) \log 2 + \log(4^x + 9) = 1 + \log(2^x + 1) \quad [\mathbf{R}: 0; 2]$$

$$(k) \log_2 \sqrt[3]{x+1} - \log_2 \sqrt[3]{9x+1} = -1 \quad [\mathbf{R}: 7]$$

$$(l) \log \sqrt{20-4x^2} = 2 \log 2 - \log x \quad [\mathbf{R}: 1; 2]$$

12. Reši enačbe:

$$(a) \frac{\log(x^2 + 2x + 1)}{\log(5x + 1)} = 1 \quad [\mathbf{R}: 3; 0 \text{ ne ustreza}]$$

$$(b) \frac{\log 3x}{\log(2x-3)} = 2 \quad [\mathbf{R}: 3; \frac{3}{4} \text{ ne ustreza}]$$

$$(c) \log^2 - 2 \log x - 3 = 0 \quad [\mathbf{R}: 1000; \frac{1}{10}]$$

$$(d) 6 \log^2 x + \log x = 2 \quad [\mathbf{R}: \sqrt{10}; \sqrt[3]{0,01}]$$

13. Nariši naslednje grafe logaritemskih funkcij na isti koordinatni sistem.

$$(a) y = \log_2 x, y = \log_3 x, y = \log_5 x, y = \log x$$

$$(b) y = -\log_2 x, y = \log_{\frac{1}{2}} x, y = \log_{\frac{1}{5}} x, y = \log_{\frac{1}{10}} x$$

$$(c) y = \log_4 x, y = \log_4(x+1), y = \log_4(x-2), y = \log_4 x - 2$$

$$(d) y = \ln x, y = -\ln x - 1, y = -\ln(x+3), y = -\log x + 2$$

14. Reši enačbe grafično.

$$(a) \log_2 x = 3 - x \quad [\mathbf{R}: x = 2]$$

$$(b) \log_2(x+1) = x^2 \quad [\mathbf{R}: x = 0; x = 1]$$

$$(c) \log_3 x + 1 = x^{-1} \quad [\mathbf{R}: x = 1]$$

$$(d) -\ln(x+2) + 1 = x^{-2} \quad [\mathbf{R}: x = -1]$$